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A BACTERIOLOGICAL SURVEY OF THE LITTLE RIVER, SOUTH CAROLINA - CALABASH CREEK, NORTH CAROLINA AREA

Environmental Protection Agency
Athens, Georgia

November 1972

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Region IV
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INTRODUCTION

The South Carolina Pollution Control Authority and the North Carolina Office of Water and Air Resources requested a bacterial water quality study be made in the Intracoastal Waterway - Calabash Creek area of North and South Carolina. The major objectives of the study were to determine:

- The major sources of bacterial contamination within the study area and their effects on bacterial water quality,
- Water movement within the Intracoastal Waterway,
- The extent of saltwater intrusion in the Intracoastal Waterway.
- The bacterial quality of selected stormwater and waste discharges along the beach areas of Myrtle Beach and North Myrtle Beach, South Carolina.

The area included in this study is part of an overall area referred to as the "Grand Strand". The Grand Strand, one of the most popular vacation and resort areas in the southeastern United States, is presently experiencing a period of rapid residential and commercial development. This development has increased demands on existing waste treatment facilities and, in turn, increased demands on receiving environmental waters.

This report is primarily concerned with the aspect of bacterial contamination in the study area.

SUMMARY AND CONCLUSIONS

SUMMARY

1. Field investigations were conducted in the Myrtle Beach area during April and August 1972, to determine the bacterial quality of portions of the Intracoastal Waterway, Calabash Creek and major waste sources discharging into these waters. During September, a similar study was conducted along selected beach areas of Myrtle Beach and North Myrtle Beach.

2. The bacterial quality and effluent flows of the major waste sources discharging to the Intracoastal Waterway were:

Source	APRIL			AUGUST		
	Flow (MGD)	Mean Total Coliform/ 100 ml	Mean Fecal Coliform/ 100 ml	Flow (MGD)	Mean Total Coliform/ 100 ml	Mean Fecal Coliform/ 100 ml
Lower Myrtle Beach Oxidation Pond	1.650	4,300,000	940,000	2.940	2,700,000	870,000
Upper Myrtle Beach Oxidation Pond	0.250	880,000	200,000	0.392	4,200,000	900,000
Ocean Drive Oxidation Pond	0.093	1,600,000	330,000	0.281	4,900,000	860,000
Crescent Beach Oxidation Pond	0.069	23,000	6,600	0.185	5,500,000	860,000
Myrtle Beach Air Force Base STP	0.421	280	96	0.519	11,000	1,000

3. During August, Salmonella isolation was attempted from the effluents of the five major waste sources with the following results:

Waste Source	Salmonella Serotypes Isolated
Lower Myrtle Beach Oxidation Pond	ser. Newport, ser. Bredeney
Upper Myrtle Beach Oxidation Pond	ser. Anatum
Ocean Drive Oxidation Pond	ser. Kottbus
Crescent Beach Oxidation Pond	ser. Gaminara, ser. Kottbus
Myrtle Beach Air Force Base STP	None isolated

4. During April, mean total and fecal coliform densities in the South Carolina portion of the Intracoastal Waterway increased from 540 and 59/100 ml upstream from the Myrtle Beach waste discharges to 4700 and 1100/100 ml downstream from some of the waste discharges. Similarly, in August mean total and fecal coliform densities increased from 700 and 59/100 ml upstream from the waste discharges to 67,000 and 3400/100 ml downstream from some of the waste discharges.

5. Mean total coliform densities in Calabash Creek ranged from 280 to 830/100 ml during April and from <140 to 550/100 ml during August. Mean fecal coliform densities ranged from <39 to 120/100 ml during April and from <22 to <79/100 ml during August.

6. Mean total coliform densities in the North Carolina portion of the Intracoastal Waterway ranged from 99 to 300/100 ml during April and from 32 to <74/100 ml during August. Mean fecal coliform densities were <25/100 ml at all stations during April and August.

7. During August, persons were observed swimming and water skiing in the Intracoastal Waterway in the vicinity of major waste discharges.

8. During the April and August studies, 17 different Salmonella enteriditis serotypes were isolated at 10 stations in the South Carolina portion of the Intracoastal Waterway and at one sampling site in Calabash Creek.

9. The average background chloride concentration in the South Carolina portion of the Intracoastal Waterway (Enterprise Landing) was 10 mg/l during August. Maximum saltwater intrusion was observed in the vicinity of Briarcliff Marina (mile 354) during August.

10. A water movement study conducted during April in the South Carolina portion of the Intracoastal Waterway showed a total travel time from the Highway 501 bridge to Little River Inlet of 92 hours. The average ebb tide velocity was 0.9 statute miles per hour and the average flood tide velocity was 0.6 statute miles per hour.

11. Surf stations sampled during the beach study had mean total and fecal coliform densities ranging from 30 to 280/100 ml and 20 to 88/100 ml, respectively.

12. Mean total and fecal coliform densities of storm sewer effluents ranged from 660 to 14,000/100 ml and 110 to 13,000/100 ml, respectively, during the beach study. Creeks and swashes discharging to beach areas had mean total and fecal coliform densities which ranged from 580 to 100,000/100 ml and 110 to 24,000/100 ml, respectively.

13. The Holiday Inn Travel Park and the Lake Arrowhead Campground waste treatment facilities discharge treated effluents that ultimately flow

into the Atlantic Ocean. Samples were collected at the point of discharge across the beach. The Holiday Inn Travel Park discharge had respective mean total and fecal coliform densities of 120,000 and 2,900/100 ml, and the Lake Arrowhead effluent had mean total and fecal coliform densities of 16,000 and 180/100 ml.

CONCLUSIONS

1. Development within the study area has created demands on the existing municipal waste collection and treatment systems that exceed the capacities of these systems. Much of the past development has taken place without the restraints of a comprehensive area-wide wastewater collection and treatment plan and has resulted in a proliferation of private and public waste handling systems, many of which discharge inadequately treated wastes. If this growth trend continues without adequate consideration for waste treatment needs the result will be to jeopardize the most important natural resource of the area -- clean water.

2. Of the major waste sources sampled, the two Myrtle Beach oxidation ponds contribute in excess of 90 percent of the fecal coliform contamination to the Intracoastal Waterway, which results in significant degradation of bacterial water quality.

3. During the April study, the North Myrtle Beach and Myrtle Beach Air Force Base waste treatment facilities were operating within their design capacities. The largest Myrtle Beach facility was operating approximately 60 percent in excess of hydraulic design capacity.

4. During the August study, only the Crescent Beach oxidation pond and the Myrtle Beach Air Force Base STP were operating within the hydraulic design capacities. The Myrtle Beach oxidation ponds, LMB-01, located near 10th Avenue South, and UMB-01, located near 48th Avenue, North, were operating at 194 and 58 percent in excess of hydraulic design capacity. The Ocean Drive facility was operating approximately 87 percent in excess of hydraulic design capacity.

5. Of the major waste sources discharging into the Intracoastal Waterway, only the Myrtle Beach Air Force Base sewage treatment plant provides waste disinfection.

6. The bacterial standard applicable to that portion of the Intracoastal Waterway located in South Carolina classified as Class SA was violated during both the April and August study periods. Violations of the South Carolina Class A bacterial standard were noted at low tide in the Intracoastal Waterway in the vicinity of the Highway 17 bridge and the town of Little River.

7. Most of the coliform contamination in Calabash Creek originates upstream from the town of Calabash. Coliform contamination in the Intracoastal Waterway appeared to have little apparent effect on the bacterial quality of Calabash Creek.

8. The North Carolina Class SA bacterial standard applicable to Calabash Creek was violated during both the April and August study periods.

9. The bacterial quality of the bathing beach waters sampled were within the recommended South Carolina standards for primary contact recreation. However, under the present classification (Class SA), approximately half of the stations were in violation of the Class SA bacterial standard.

10. During dry periods, most stormwater discharges to the beach areas are minimal. However, these discharges do represent potential sources of pathogenic bacteria and create small pools and streams which serve as attractive places for small children to play. During periods of rainfall, these discharges contribute significant bacterial contamination to the receiving waters.

11. The secondary-treated effluents from the Holiday Inn Travel Park and Lake Arrowhead Campground flow across recreational beaches constituting a potential health risk to those who come into direct contact with these discharges.

RECOMMENDATIONS

1. To achieve full growth potential with minimal damages to environmental waters, the "Grand Strand" area must establish and actively promote an authoritative body to develop and regulate comprehensive area-wide waste handling policies. Such an authority must provide the local impetus for systematic development with a perspective of the future waste handling needs of the area. To accomplish this, the authority must:

    - o Coordinate with private and governmental entities to assure that maximum benefit is derived from available funding.
    - o Assess the need for future environmental studies necessary for the planning process.
    - o Consider alternative methods for future wastewater treatment and disposal needs of the area.

2. Reclassification of the freshwater portion of the Intracoastal Waterway in South Carolina south of Little River Inlet and south of the point of maximum saltwater intrusion from Class SA to an appropriate freshwater classification must be considered. Likewise, the reclassification of the saltwater portion of the Intracoastal Waterway south of Little River Inlet from Class A to an appropriate saltwater classification must be considered.

3. Adequate treatment and disinfection of all domestic waste effluents discharged to the Intracoastal Waterway must be provided and means

of alerting water users of the location of these discharges established.

4. The current practice of discharging a secondary treated wastewater effluent across a recreational beach should be discontinued and alternative means of disposal examined.

5. Alternative means of handling stormwater runoff, presently discharged across recreational beaches, should be examined. Removal of this runoff would improve not only the aesthetic value of the beaches but would also remove the bacterial contamination transported via these discharges.

STUDY AREA

The study area extends from Sunset Beach, North Carolina, to Surfside Beach, South Carolina. The study area and sampling station locations are depicted in Figures 1 and 2. A list of sampling station locations is contained in Table I.

The study area includes a portion of the South Carolina coastal region known as the "Grand Strand". The Grand Strand, a 50-mile long area, is a rapidly developing vacation and resort center. Myrtle Beach is presently the center of most of the resort and vacation development. The 1970 census of Myrtle Beach showed the resident population to be 9,035.(1) However, during the tourist season, the population may increase approximately 10-fold. During peak tourist weekends, the population along the Grand Strand may reach 212,000.(2)

The study included sampling portions of the Intracoastal Waterway located within Horry County, South Carolina, and Brunswick County, North Carolina, and Calabash Creek located in Brunswick County, North Carolina, beach areas adjacent to Myrtle Beach and North Myrtle Beach and major waste discharges to these waters.

The major portion of the Intracoastal Waterway within the study area was formed by dredging Little River between Little River Inlet and the Waccamaw River. Little River Swamp gives rise to Little River which flows generally northeasterly, parallel to the coast and empties into the Atlantic Ocean through Little River Inlet. The basin divide is about 10 miles southwest of the U. S. Highway 501 bridge. The portion of the waterway that extends into North Carolina intersects Little River just

FIGURE 1

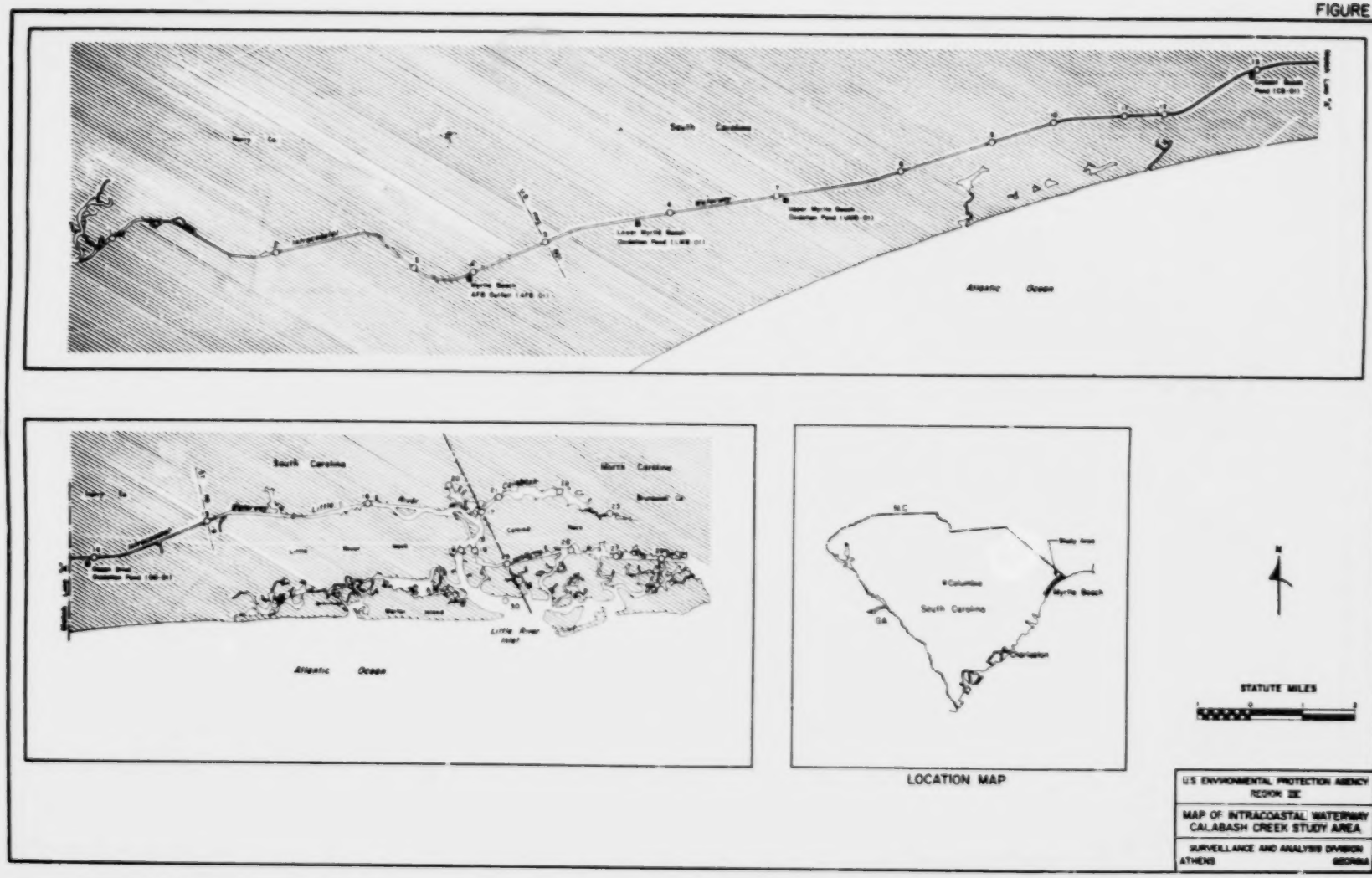

South Carolina
Atlantic Ocean
North Carolina
Little River
LOCATION MAP
NC
Columbia
South Carolina
GA
Myrtle Beach
Charleston
STATUTE MILES
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV
MAP OF INTRACOASTAL WATERWAY
CALABASH CREEK STUDY AREA
SURVEILLANCE AND ANALYSIS DIVISION
ATHENS
GEORGIA

FIGURE 2

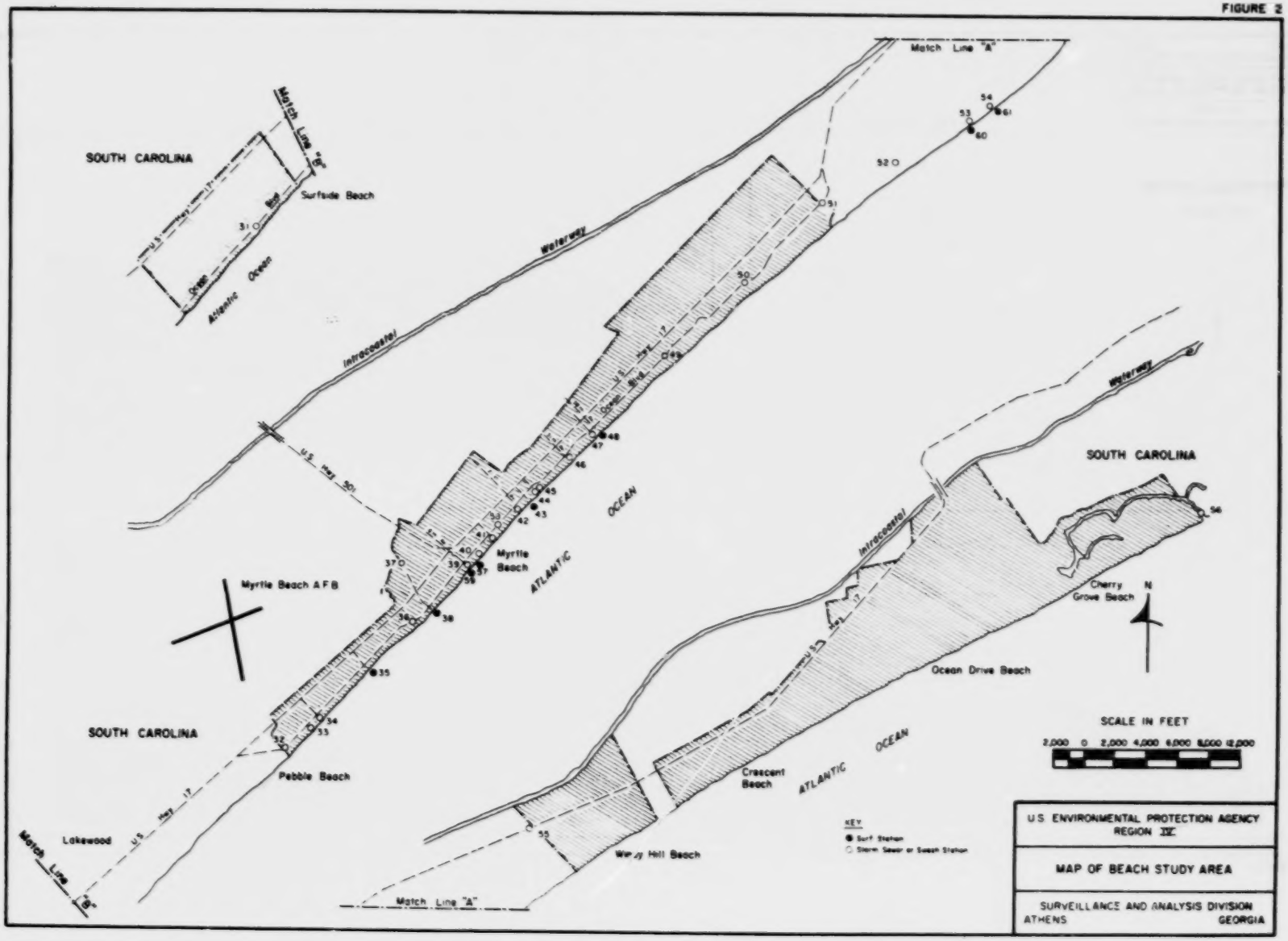

Match Line "A"
SOUTH CAROLINA
Match Line "B"
Surfside Beach
Atlantic Ocean
Waterway
Intracoastal
U.S. Hwy 501
OCEAN
Myrtle Beach
ATLANTIC
Myrtle Beach A F B
SOUTH CAROLINA
Pebble Beach
Lakewood
U.S. Hwy 17
Match Line "B"
Match Line "A"
Windy Hill Beach
Crescent Beach
ATLANTIC
OCEAN
Ocean Drive Beach
Cherry Grove Beach
SOUTH CAROLINA
Waterway
Intracoastal
N
SCALE IN FEET
2,000 0 2,000 4,000 6,000 8,000 12,000
KEY
Surf Station
Storm Sewer or Swash Station
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IX
MAP OF BEACH STUDY AREA
SURVEILLANCE AND ANALYSIS DIVISION
ATHENS GEORGIA

TABLE I

List of Sampling Station Locations*

Station No.	Location
01	Intracoastal Waterway, 1/2 mile north of Enterprise Landing (mile 374.3).
02	Intracoastal Waterway at Socastee bridge (mile 371.0).
03	Intracoastal Waterway at Hague Marina (mile 368.0).
04	Intracoastal Waterway, 0.1 mile downstream from Myrtle Beach AFB outfall (mile 367.0).
05	Intracoastal Waterway at U. S. Highway 501 bridge (mile 365.5).
06	Intracoastal Waterway, 3/4 mile downstream from the Lower Myrtle Beach Oxidation Pond outfall (mile 363.0).
07	Intracoastal Waterway downstream from the Myrtlewood Golf Club (mile 360.6).
08	Intracoastal Waterway downstream from the Upper Myrtle Beach Oxidation Pond outfall (mile 359.1).
09	Intracoastal Waterway downstream from Myrtle Beach Manor (mile 356.6).
10	Intracoastal Waterway at mile 355.4.
11	Intracoastal Waterway at Briarcliff Marina (mile 354.0).
12	Intracoastal Waterway at mile 353.3.
13	Intracoastal Waterway, 1/4 mile downstream from the Crescent Beach Oxidation Pond outfall (mile 349.5).
14	Intracoastal Waterway, 1/4 mile downstream from the Ocean Drive Oxidation Pond outfall (mile 349.5).
15	Intracoastal Waterway at South Carolina Highway 9 bridge (mile 347.2).
16	Intracoastal Waterway at Little River Dock (mile 344.2).
17	Calabash Creek at North Carolina-South Carolina state line
18	Intracoastal Waterway near Little River Inlet.
19	Little River near Little River Inlet.
20	Mullet Creek 0.1 mile upstream from confluence with Little River.
21	Calabash Creek, 0.4 mile upstream from North Carolina-South Carolina state line.
22	Calabash Creek, 0.9 mile upstream from North Carolina-South Carolina state line.
23	Calabash Creek at North Carolina State Road 1164 bridge.
25	Intracoastal Waterway at North Carolina-South Carolina state line (mile 341.0).
26	Intracoastal Waterway at Bonaparte Landing (mile 338.6).
27	Intracoastal Waterway, 1.0 mile north of Bonaparte Landing (mile 338.6).
29	Intracoastal Waterway at Sunset Beach bridge (mile 338.0).
30	Little River at mouth of Little River Inlet.
31	Unnamed swash between 4th and 5th Avenue N at Surfside Beach.
32	Midway Swash at Highway 73 bridge.
33	Concrete culvert approximately 100 yards south of Holiday South Motel.
34	Concrete culvert at Tiki Motel at 25th Avenue S, Myrtle Beach.
35	Surf station at end of 15th Avenue S, Myrtle Beach.
36	Withers Swash at Highway 73 bridge.
37	Withers Swash at Broadway Street bridge.
38	Surf station at 1st Avenue N, Myrtle Beach.
39	Metal storm sewer at end of 8th avenue N, Myrtle Beach.
40	Storm sewer near end of 10th Avenue N, Myrtle Beach.
41	Concrete storm sewer at end of 14th Avenue N, Myrtle Beach.
42	Concrete storm sewer at end of 21st Avenue N, Myrtle Beach.
43	Surf station at end of 23rd Avenue N, Myrtle Beach.
44	Concrete storm sewer at end of 24th Avenue N, Myrtle Beach.
45	Metal storm sewer at end of 24th Avenue N, Myrtle Beach.
46	Concrete storm sewer at 31st Avenue N, Myrtle Beach.
47	Concrete storm sewer at 37th Avenue N, Myrtle Beach.
48	Surf station at end of 38th Avenue N, Myrtle Beach.
49	Deephead Swash at Highway 73 bridge, Myrtle Beach.
50	Cane Patch Swash at Highway 73 bridge, Myrtle Beach.
51	Bear Creek at Highway 73 culvert.
52	Singleton Swash at beach between Ocean Dunes and Lake Arrowhead Campground.
53	Lake Arrowhead discharge at beach.
54	Holiday Inn Travel Park in ditch at beach.
55	Unnamed swash at Kings Highway south of Windy Hill.
56	Hog Inlet at Cherry Grove Beach at point.
57	Surf station at end of 9th Avenue N, Myrtle Beach.
58	Concrete and metal pipes below 16th Avenue N, Myrtle Beach.
59	Surf station at end of 8th Avenue N, Myrtle Beach.
60	Surf station at Lake Arrowhead Campground.
61	Surf station at Holiday Inn Travel Park.

*Stream miles are statute miles according to Nautical Chart 835-SC, January 1971.

south of the North Carolina-South Carolina state line.

Calabash Creek is a tidal stream which rises in Brunswick County, North Carolina, and flows into Little River just south of the North Carolina-South Carolina state line.

Beaches included in the study, for the most part, were located adjacent to urban areas and subject to heavy recreational use during the summer months.

WATER QUALITY STANDARDS

South Carolina Waters: The Intracoastal Waterway from the North Carolina state line to the point of saltwater intrusion within Horry County is classified as Class A. Class A waters are classified as suitable for use as swimming waters. The bacterial criterion applicable to these waters requires that the fecal coliform concentration not exceed a geometric mean of 200/100 ml, nor that more than 10 percent of the total samples during any 30-day period exceed 400/100 ml.(3)

The Intracoastal Waterway from the point of saltwater intrusion to Winyah Bay is classified as Class SA. All coastal waters from the land to the limits of state jurisdiction off-shore of Horry County are classified as Class SA. These classifications were filed with the Secretary of State June 8, 1956. Class SA waters are designated as suitable for shellfishing for marketing purposes. The bacterial criterion applicable to these waters is prescribed by the U. S. Public Health Service Shellfish Standards.(4) This standard requires that the total coliform bacteria group are not to exceed a median MPN of 70/100 ml, and not more than 10 percent of the samples shall exceed an MPN of 230/100 ml in those areas most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions. Also required under this classification is a provision that no inadequately disinfected sewage effluent can discharge to these waters.

North Carolina Waters: Calabash Creek from its source to the North Carolina-South Carolina state line and the Intracoastal Waterway in its

entirety are classified as Class SA. The bacterial criterion applicable to these waters is prescribed by the U. S. Public Health Service Shellfish Standards.(4)

WASTE SOURCES

Within the study area, there are an estimated 40 point sources of waste with combined estimated hydraulic design capacities in excess of 3 MGD. Most are waste treatment facilities serving limited populations such as laundromats, subdivisions, restaurants, and campgrounds. Small, single-cell oxidation ponds are the most common type of waste treatment utilized. A considerable portion of the study area remains unsewered and depends on septic tanks for domestic waste treatment.

The major waste sources include three oxidation ponds operated by the city of Myrtle Beach, two oxidation ponds operated by the city of North Myrtle Beach and a secondary sewage treatment plant located at the Myrtle Beach Air Force Base.

Myrtle Beach has an estimated resident population of 10,000. At times during the peak tourist season (May-September), the population exceeds 125,000. Myrtle Beach is served by three single-cell oxidation ponds of 35, 12.5, and 5 acres in size. The 35-acre facility (LMB-01) located on 10th Avenue South, has a hydraulic design capacity of 1.0 MGD. An estimated 70 percent of the waste from the city's sewered population is treated in the LMB-01 facility. The 12.5-acre pond (UMB-01) located north of 48th Avenue North, has a hydraulic design capacity of 0.250 MGD. Both of these ponds discharge directly into the Intracoastal Waterway. Neither the LMB-01 nor UMB-01 treatment facilities provide for waste effluent disinfection. A newly-constructed 5-acre pond (receiving wastes from Ocean Dunes Residential Area) operated by Myrtle Beach did not have a discharge at the time of these studies.

Plans have been submitted to the South Carolina Pollution Control Authority and U. S. Environmental Protection Agency for improvements of the existing Myrtle Beach treatment facilities.

North Myrtle Beach has a resident population of approximately 2,000 people. During peak tourist season, the daily population may exceed 50,000. Approximately 75 percent of the North Myrtle Beach area is sewered and is served by two single-cell oxidation ponds, the five-acre Ocean Drive facility (OD-01) and the seven-acre Crescent Beach facility (CB-01). The total hydraulic design capacity of the North Myrtle Beach system is approximately 0.400 MGD. Neither the OD-01 nor CB-01 treatment facilities provide for waste effluent disinfection. Both of these ponds discharge directly into the Intracoastal Waterway.

Plans have been submitted to the South Carolina Pollution Control Authority and U. S. Environmental Protection Agency outlining significant improvements of the existing North Myrtle Beach waste collection and treatment facilities.

The Myrtle Beach Air Force Base (AFB-01) is served by a secondary sewage treatment plant with chlorination. The hydraulic design capacity of the facility is 0.720 MGD. This facility serves a population estimated between 2,000 and 5,000 people. The effluent from this facility discharges directly into the Intracoastal Waterway.

The South Carolina Welcome Center, located on U. S. Highway 17, is served by an extended aeration treatment plant with post-chlorination. The design capacity of the facility is approximately 7,500 gallons per day. Effluent from this discharge enters Little River via Mullet Creek.

STUDY FINDINGS

During two field studies conducted in April and August 1972, water quality stations and waste sources were sampled. In September, an additional study was conducted on waste sources discharging to beaches in the area. Figures 1 and 2 depict all sampling station locations.

Data collected during these investigations are contained in Appendix B and summarized in Tables II through VIII. Figures 3 through 15 depict these data.

BACTERIAL RESULTS

Coliform Bacteria

Waste Sources

Each waste source effluent was sampled hourly for twelve hours on two different days during each study. Data collected at these waste sources are summarized in Table II.

Myrtle Beach

The Myrtle Beach LMB-01 oxidation pond discharges into the Intracoastal Waterway approximately 1 3/4 miles downstream from the U. S. Highway 501 bridge. During the April study, the average discharge from this pond was 1.6 MGD. Effluent total coliform densities ranged from 1,100,000 to 16,000,000/100 ml and fecal coliform densities ranged from 460,000 to 2,400,000/100 ml during the sampling period. The mean[1/] effluent total and fecal coliform densities during the sampling period were 4,300,000 and 940,000/100 ml, respectively (Table II).

1/ All mean values are geometric means.

TABLE II

MUNICIPAL WASTE SOURCE DATA SUMMARY
APRIL-AUGUST 1972

APRIL

Waste Source	Total Coliform/100 ml				Fecal Coliform/100 ml				Number of Samples	Average Flow MGD	Residual Chlorine mg/l
	Maximum	Minimum	Average	Mean	Maximum	Minimum	Average	Mean			
AFB-01	540,000	20	68,000	280	49,000	20	6,200	96	8	0.256	1.76
UMB-01	1,400,000	330,000	98,000	880,000	490,000	110,000	230,000	200,000	8	0.250	N.C.
LMB-01	16,000,000	1,100,000	6,000,000	4,300,000	2,400,000	460,000	1,100,000	940,000	8	1.650	N.C.
CB-01	92,000	2,800	33,000	23,000	35,000	1,700	11,000	6,600	8	0.069	N.C.
OD-01	3,500,000	490,000	1,800,000	1,600,000	790,000	230,000	360,000	330,000	8	0.093	N.C.
WC-01	20	20	20	20	20	20	20	20	6	0.004	8.95

AUGUST

Waste Source	Total Coliform/100 ml				Fecal Coliform/100 ml				Number of Samples	Average Flow MGD	Residual Chlorine mg/l
	Maximum	Minimum	Average	Mean	Maximum	Minimum	Average	Mean			
AFB-01	2,400,000	330	310,000	11,000	1,600,000	20	200,000	1,000	8	0.519	0.40
UMB-01	7,900,000	2,200,000	4,600,000	4,200,000	3,500,000	460,000	1,300,000	900,000	8	0.392	N.C.
LMB-01	5,400,000	1,100,000	3,100,000	2,700,000	1,700,000	330,000	960,000	870,000	8	2.940	N.C.
CB-01	13,000,000	2,200,000	7,000,000	5,500,000	2,200,000	330,000	1,000,000	860,000	8	0.185	N.C.
OD-01	17,000,000	230,000	7,800,000	4,900,000	2,200,000	230,000	1,000,000	860,000	8	0.281	N.C.

N.C. - No Chlorination

During the April study, the effluent from the LMB-01 pond exceeded the hydraulic design flow by 60 percent. Although the efficiency of the pond was not determined, the presence of considerable algal matting together with the discharge of large amounts of visible solids reflected operational inefficiency of the facility.

To permit a comparison of the relative significance of the various waste sources discharging into the Intracoastal Waterway, mean coliform concentrations were converted to estimated total numbers of coliforms discharged per day. These were calculated using the following equation:

$$\text{Number of coliform/day} = Q(\text{MGD}) \times \text{MPN}/100\ \text{ml} \times 37.8 \times 10^{6}$$

During the April study, the LMB-01 daily discharge was estimated at 26×10^{13} total coliforms and 56×10^{12} fecal coliforms. This discharge accounted for an estimated 94.8 percent of the total coliforms and 94.6 percent of the fecal coliforms discharged to the waterway by the five major waste sources sampled.

In the August study, the total coliform densities in the LMB-01 effluent ranged from 1,100,000 to 5,400,000/100 ml and the fecal coliform densities ranged from 330,000 to 1,700,000/100 ml. The mean total and fecal coliform densities were 2,700,000 and 870,000/100 ml, respectively, for the sampling period (Table II).

The average discharge during the August study was 2.94 MGD. At this flow rate, the facility was operating approximately 194 percent in excess of design capacity and represented an increase of 134 percent over the operating level measured in April. This flow reflects the increased demand placed on the sewerage system by tourist traffic.

During "peak tourist weekends", flow rates will at times exceed the high levels measured during the August study.

The LMB-01 daily discharge of total and fecal coliforms during the August study was approximately 30 X 10^{13} and 97 X 10^{12}, respectively. Based on these daily effluent values, this discharge accounted for an estimated 66.3 percent of the total coliforms and 76.3 percent of the fecal coliforms contributed to the waterway from the waste sources sampled. Although the relative coliform percentage contribution was less in August than observed in April, the facility was still the most significant contributor of bacterial contamination to the waterway.

The second Myrtle Beach pond (UMB-01) discharges into the Intracoastal Waterway at approximately mile 360.4. During the April study, this pond discharged an estimated 0.250 MGD. Effluent total coliform densities ranged from 330,000 to 1,400,000/100 ml and the fecal coliform densities ranged from 110,000 to 490,000/100 ml during the sampling period. Mean total and fecal coliform densities were 880,000 and 200,000/100 ml, respectively (Table II).

During the August study, the average discharge from the UMB-01 pond was 0.392 MGD. The total coliform density of the effluent ranged from 2,200,000 to 7,900,000/100 ml and the fecal coliform density ranged from 460,000 to 3,500,000/100 ml for the sampling period. Mean total and fecal coliform densities were 4,200,000 and 990,000/100 ml, respectively (Table II).

The UMB-01 effluent accounted for an estimated 3.1 and 3.4 percent of the total and fecal coliforms contributed to the waterway from the

waste sources sampled during April and 13.7 and 11.8 percent during August.

The UMB-01 pond was operating at hydraulic design capacity during the April study period while the average effluent flow during the August study period showed the pond was operating approximately 58 percent in excess of design capacity.

North Myrtle Beach

Two oxidation ponds operated by the city of North Myrtle Beach, Crescent Beach (CB-01) and Ocean Drive (OD-01), were sampled during both studies.

The Crescent Beach pond discharges into the Intracoastal Waterway at approximately mile 351.3. During the April study, the average effluent flow was 0.069 MGD. Total coliform densities in the effluent ranged from 2,800 to 92,000/100 ml and the fecal coliform densities ranged from 1,700 to 35,000/100 ml for the sampling period. Mean total and fecal densities were 23,000 and 6,600/100 ml, respectively (Table II).

The CB-01 facility had an average discharge of 0.185 MGD during the August study period. Effluent total coliform densities ranged from 2,200,000 to 13,000,000/100 ml and the fecal coliform densities ranged from 330,000 to 2,200,000/100 ml for the sampling period. Mean total and fecal coliform densities were 5,500,000 and 860,000/100 ml, respectively (Table II).

During the April study, the facility was operating at approximately 28 percent of hydraulic design capacity. The average effluent flow during the August study was approximately 268 percent greater than

measured in April. Although the flows dramatically increased between April and August, the facility operated at only 74 percent of capacity. However, the increased loading was reflected by an increased coliform contribution to the waterway. An estimated 8.5 percent of the total coliforms and 4.8 percent of the fecal coliforms contributed to the waterway during the August period were discharged from the CB-01 pond as compared to less than one percent of the total contribution in April.

The Ocean Drive pond (OD-01) discharged an average of 0.093 MGD during the April study period. Effluent total coliform densities ranged from 490,000 to 3,500,000/100 ml and the fecal coliform densities ranged from 230,000 to 790,000/100 ml for the sampling period. Mean total and fecal coliform densities were 1,600,000 and 330,000/100 ml, respectively (Table II).

During the August study, the OD-01 discharge averaged 0.281 MGD. Effluent total coliform densities ranged from 230,000 to 17,000,000/100 ml and fecal coliform densities ranged from 230,000 and 2,200,000/100 ml. Mean total and fecal coliform densities were 4,900,000 and 860,000/100 ml, respectively, for the sampling period (Table II).

Both the effluent flow and coliform densities were considerably higher during the August study than during the April study. The August flow was approximately 302 percent higher than measured during April and was approximately 87 percent in excess of hydraulic design capacity.

Of the waste sources sampled, the OD-01 facility accounted for an estimated 11.5 and 7.3 percent of the total and fecal coliforms contributed to the waterway during the August study as compared to 2.1 and 2.0 percent during April.

Myrtle Beach Air Force Base

The Myrtle Beach Air Force Base sewage treatment plant discharges directly into the Intracoastal Waterway at approximately mile 367.1. During the April study, the average discharge was approximately 0.421 MGD. Effluent total coliform densities ranged from 20 to 540,000/100 ml and the fecal coliform densities ranged from 20 to 49,000/100 ml for the sampling period. Mean effluent total and fecal coliform densities were 280 and 96/100 ml, respectively.(Table II) During the sampling period, the total residual chlorine concentrations ranged from 0.1 to 5.5 mg/1.

The average AFB-01 discharge during the August study was 0.519 MGD. Effluent total coliform densities ranged from 330 to 2,400,000/100 ml and fecal coliform densities ranged from 20 to 1,600,000/100 ml. Mean total and fecal coliform densities were 11,000 and 1,000/100 ml, respectively, for the sampling period.(Table II) The total residual chlorine concentrations ranged from 0 to 1.0 mg/1 during the sampling period.

During both April and August, the AFB-01 discharge accounted for less than one percent of the total and fecal coliforms contributed to the waterway from the waste sources sampled. During both studies, the AFB-01 facility operated within hydraulic design capacity and produced a good quality effluent.

South Carolina Welcome Center

The Welcome Center treatment plant effluent was sampled only during the April study. The effluent flow averaged 0.004 MGD during the study. Total residual chlorine in the effluent ranged from 0.5 to greater than

15.0 mg/1. Mean total and fecal coliform densities were both 20/100 ml (Table II).

The lack of significant effluent volume and bacterial indicator densities precluded sampling this waste source during the August study.

Intracoastal Waterway and Tributaries

Results of the April and August water quality studies are presented in this section. Physical, chemical, and microbiological data are contained in Appendix B and summarized in Tables III through VI. Figures 3 through 8 depict these data.

April 1972

Intracoastal Waterway-S.C.: Station 01, located approximately 1/2 mile north of Enterprise Landing was the background station for the South Carolina portion of the waterway (Figure 1). Station 01 is on the Little River Inlet side of the tidal node, thus net flow is in the direction of Little River Inlet. Mean total and fecal coliform densities at Station 01 during April were 540 and 59/100 ml (Table III, Figure 5). Downstream from this station, the mean coliform densities gradually decreased until the effect of the Myrtle Beach Air Force Base discharge is seen.

Approximately 3 1/4 miles downstream from the Myrtle Beach AFB discharge the largest waste source, LMB-01, discharges into the waterway. The partial impact of this discharge was seen at Station 06, located 3/4 mile downstream from the outfall (Figure 5). At this point, mean total and fecal coliform densities were 2,400 and 630/100 ml. Because of the poor lateral mixing characteristics at this point in the waterway,

TABLE III
SUMMARY OF COLIFORM DATA
MYRTLE BEACH STUDY-APRIL 1972

STATION	TOTAL COLIFORM / 100 ML. MAXIMUM	MINIMUM	AVERAGE	MEAN	SAMPLES	FECAL COLIFORM / 100 ML. MAXIMUM	MINIMUM	AVERAGE	MEAN	SAMPLES
01	1300	330	610	540	8	140	20	75	59	8
02	3300	110	920	520	8	140	20	61	47	8
03	490	70	300	270	8	170	20	78	66	8
04	1300	170	510	390	8	490	20	110	64	8
05	7900	230	1800	860	8	2300	50	510	190	8
06	11000	230	3800	2400	8	2300	70	1000	630	8
07	13000	1300	5600	4700	8	4900	490	1500	1100	8
08	14000	1100	5200	4200	8	1700	170	840	650	8
09	11000	1100	4600	3600	8	2200	230	580	430	8
10	11000	430	3500	2100	8	1400	130	550	400	8
11	7900	790	2900	2100	8	1300	90	380	270	8
12	7900	790	2600	1700	7	2300	140	710	420	8
13	3300	220	1400	1000	8	1700	50	390	210	8
14	4900	330	2100	1400	8	790	70	270	210	8
15	2200	490	1400	1300	8	490	110	230	190	8
16	4900	330	1600	970	8	790	50	220	130	8
19	1300	<20	<300	<110	8	130	<20	<46	<36	8
30	4900	80	1600	810	7	330	50	140	100	7
17	1700	80	430	280	8	170	20	63	50	8
21	2300	140	660	410	8	80	<20	<45	<39	8
22	2300	220	790	600	8	170	<20	<75	<59	8
23	7900	330	1600	830	8	460	<20	<170	120	8
18	2200	<20	<490	<160	8	210	<20	<74	<52	8
25	490	20	160	110	8	130	<20	<34	<25	8
26	2300	20	550	250	8	70	<20	<26	<23	8
27	13000	50	2700	300	8	50	<20	<28	<25	8
29	790	20	210	99	8	50	<20	<28	<25	8

FIGURE 3
MEAN TOTAL AND FECAL COLIFORM DENSITIES
IN THE INTRACOASTAL WATERWAY AND CALABASH CREEK AT LOW TIDE
APRIL, 1972

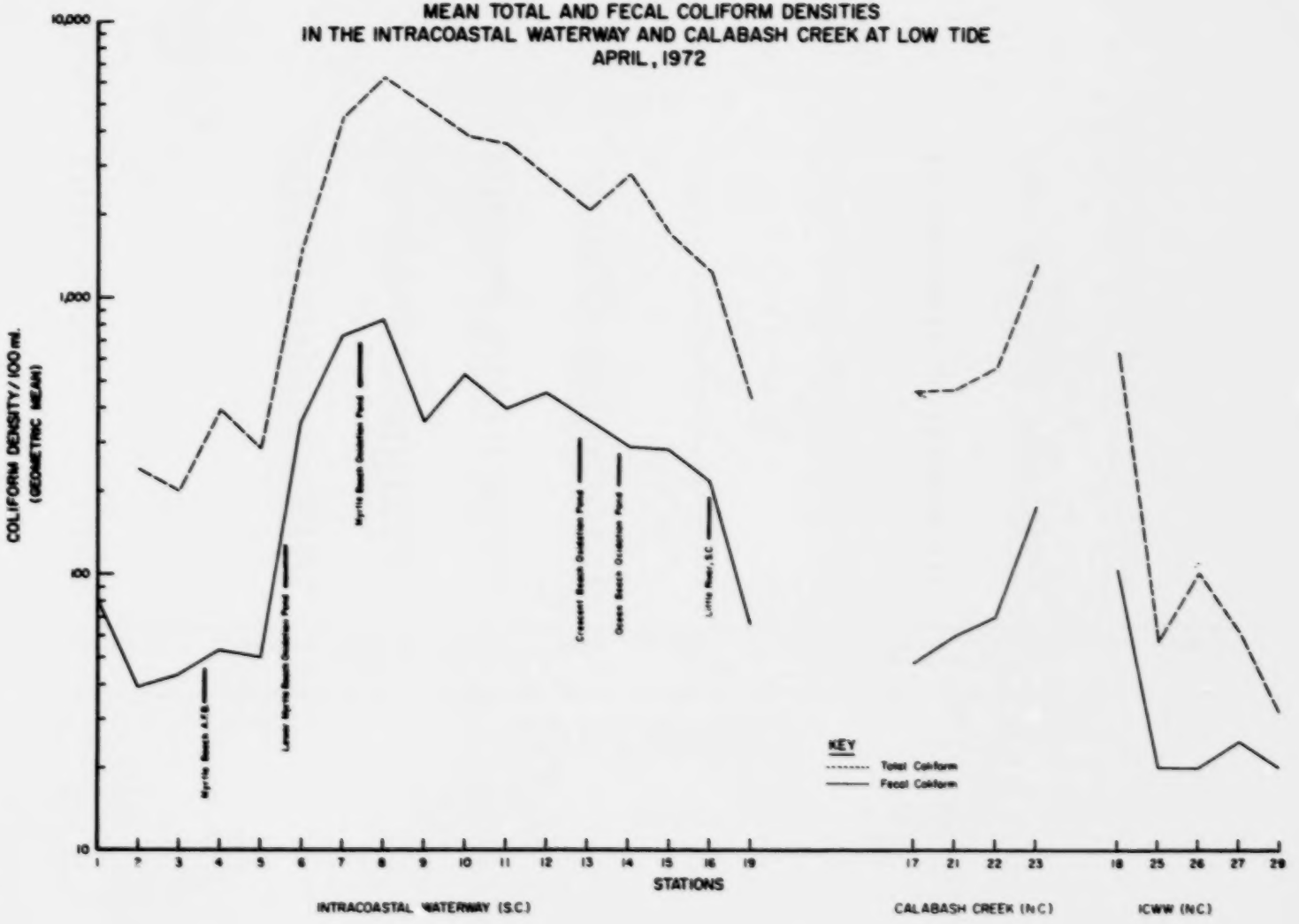


FIGURE 4
MEAN TOTAL AND FECAL COLIFORM DENSITIES
IN THE INTRACOASTAL WATERWAY AND CALABASH CREEK AT HIGH TIDE
APRIL, 1972

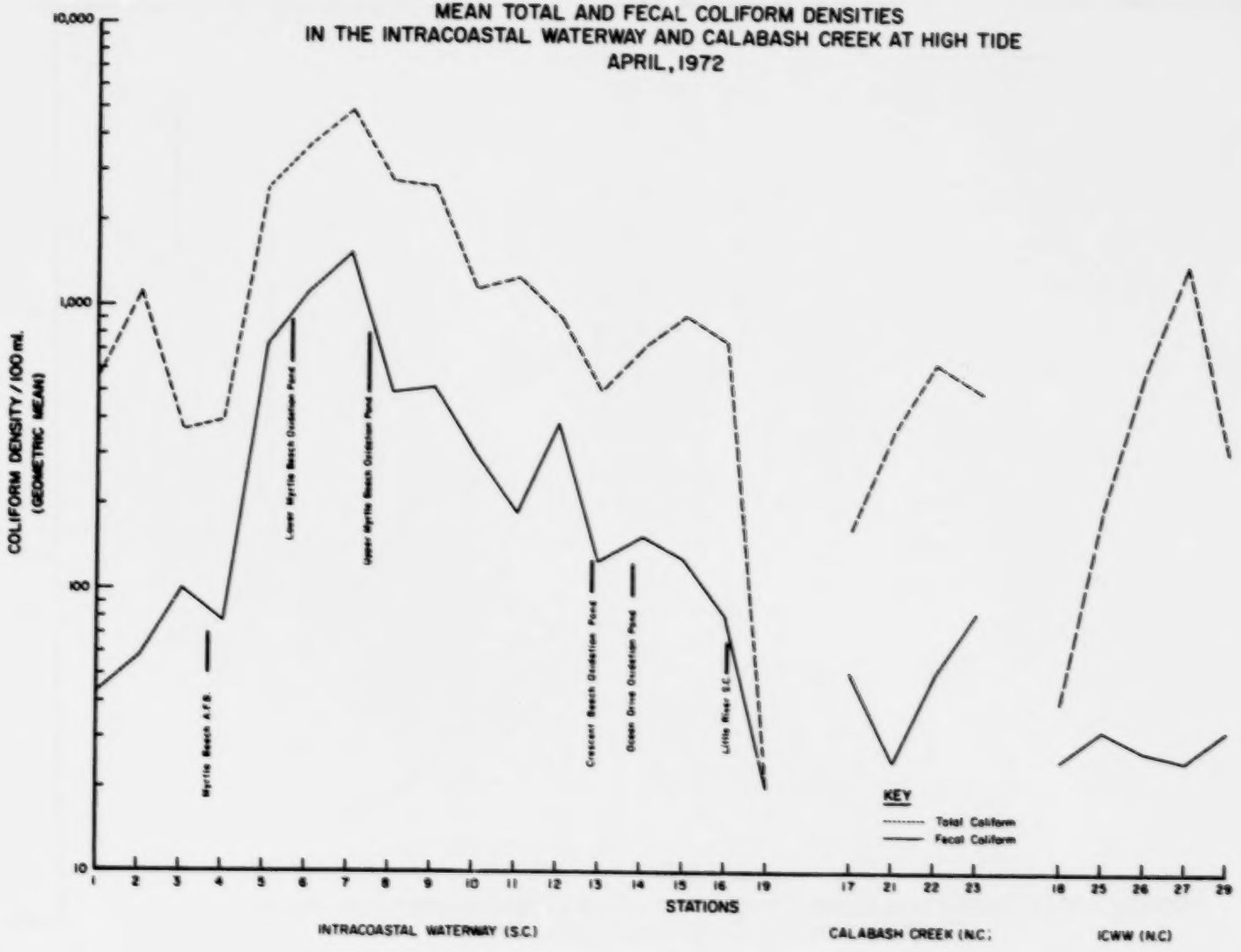
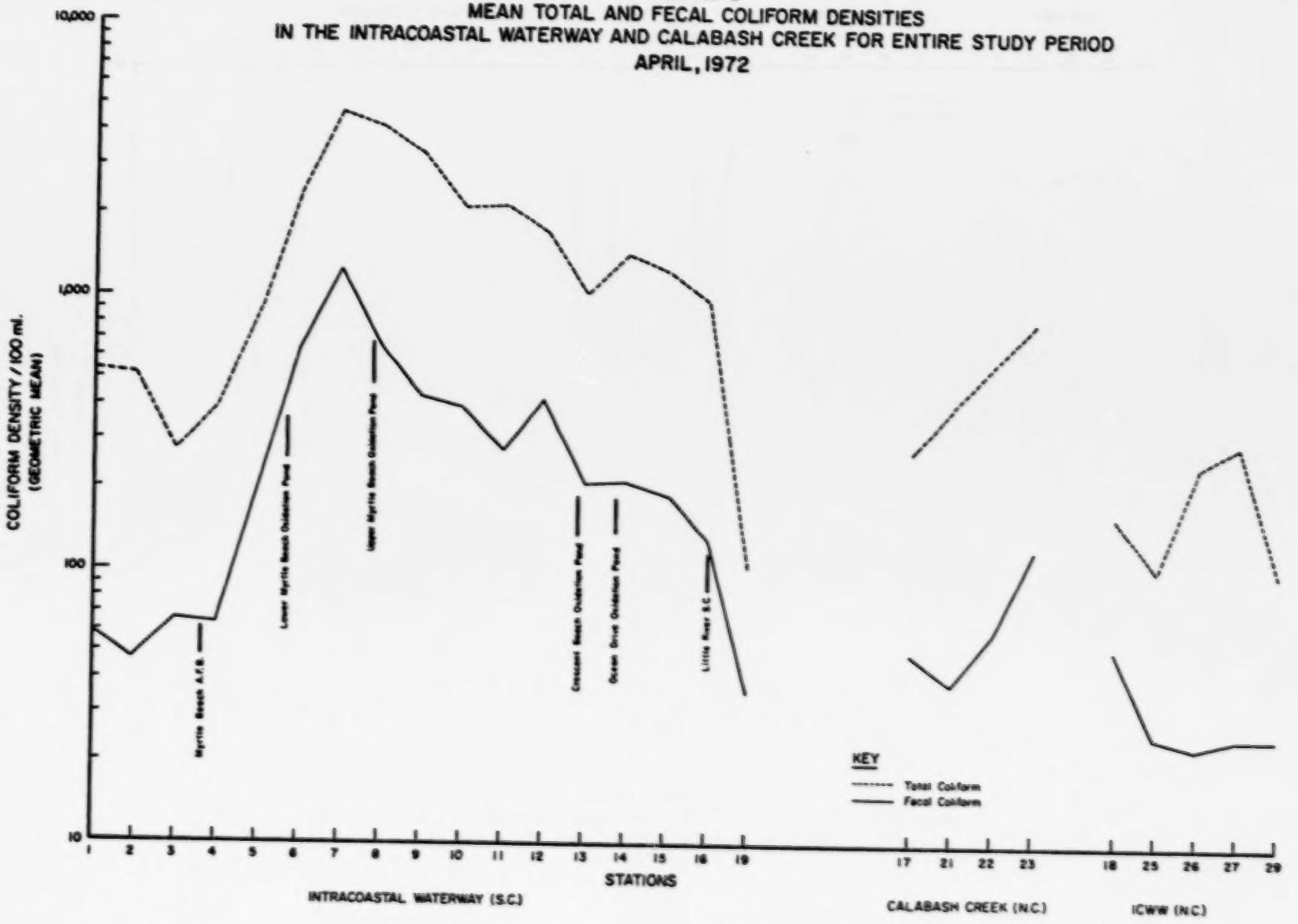


FIGURE 5
MEAN TOTAL AND FECAL COLIFORM DENSITIES
IN THE INTRACOASTAL WATERWAY AND CALABASH CREEK FOR ENTIRE STUDY PERIOD
APRIL, 1972



the full impact of the LMB-01 discharge on bacterial water quality was not fully demonstrated until Station 07. The mean total and fecal coliform densities at Station 07 were approximately six times higher than the mean coliform densities immediately upstream from the outfall (Table III and Figure 5).

Downstream from Station 07, the UMB-01 oxidation pond discharges into the waterway at approximately mile 360.4. The impact of the combined waste discharges of the LMB-01 and UMB-01 ponds was seen at Station 08 at low tide with mean total and fecal coliform densities of 6,200 and 840/100 ml, respectively (Figure 3). Station 08 at low tide had the highest mean coliform densities of any of the stations sampled. In April, an estimated 98 percent of the coliforms discharged to the waterway were introduced upstream from Station 08.

Downstream from the UMB-01 discharge, the mean coliform densities generally decreased. Approximately 1/4 mile upstream from Station 13, the Crescent Beach Oxidation Pond (CB-01) discharges into the waterway. There was no noticeable effect on bacterial water quality resulting from this discharge (Figure 5).

The Ocean Drive oxidation pond (OD-01), discharged into the waterway approximately 1/4 mile upstream from Station 14. This discharge resulted in a slight increase in the mean total coliform density at Station 14, while the mean fecal coliform density remained at the same level (Figure 5).

Mean coliform densities decreased steadily downstream from Station 14. Mean total and fecal coliform densities of <110 and <36/100 ml, respectively, at Station 19, 1 1/2 miles upstream from Little River Inlet

the full impact of the LMB-01 discharge on bacterial water quality was not fully demonstrated until Station 07. The mean total and fecal coliform densities at Station 07 station were approximately six times higher than the mean coliform densities immediately upstream from the outfall (Table III and Figure 5).

Downstream from Station 07, the UMB-01 oxidation pond discharges into the waterway at approximately mile 360.4. The impact of the combined waste discharges of the LMB-01 and UMB-01 ponds was seen at Station 08 at low tide with mean total and fecal coliform densities of 6,200 and 840/100 ml, respectively (Figure 3). Station 08 at low tide had the highest mean coliform densities of any of the stations sampled. In April, an estimated 98 percent of the coliforms discharged to the waterway were introduced upstream from Station 08.

Downstream from the UMB-01 discharge, the mean coliform densities generally decreased. Approximately 1/4 mile upstream from Station 13, the Crescent Beach Oxidation Pond (CB-01) discharges into the waterway. There was no noticeable effect on bacterial water quality resulting from this discharge (Figure 5).

The Ocean Drive oxidation pond (OD-01), discharged into the waterway approximately 1/4 mile upstream from Station 14. This discharge resulted in a slight increase in the mean total coliform density at Station 14, while the mean fecal coliform density remained at the same level (Figure 5).

Mean coliform densities decreased steadily downstream from Station 14. Mean total and fecal coliform densities of <110 and <36/100 ml, respectively, at Station 19, 1 1/2 miles upstream from Little River Inlet

were the lowest densities measured downstream from the control station (Figure 5).

Intracoastal Waterway-N.C.: During the April study, the control station (29) located at the Sunset Beach bridge, had mean total and fecal coliform densities of 99 and <25/100 ml (Table III and Figure 5). The highest mean total coliform density was measured at Station 27 where the mean density was 300/100 ml. The highest mean fecal coliform density was measured at Station 18 which had a mean density of less than 52/100 ml.

Calabash Creek: The most upstream station on Calabash Creek, Station 23, located at State Road 1164 bridge had mean total and fecal coliform densities of 830 and <170/100 ml, respectively, during the April study. Downstream from the control station, the mean coliform densities gradually decreased. Calabash Creek contributed mean total and fecal coliform densities of 280 and 50/100 ml to the Intracoastal Waterway as measured at Station 17 (Table III, Figure 5).

The stream drains a sparsely-populated area with no identifiable point sources of waste. The higher mean coliform densities occurred upstream from the most populated section of the drainage area, the town of Calabash, N.C. The source of coliform contamination in Calabash Creek was not identified.

August 1972

Intracoastal Waterway-S.C.: In August, the mean total and fecal coliform densities at Station 01 were 700 and 59/100 ml, respectively. A comparison of the August coliform densities to the April densities shows the mean total coliform density at Station 01 was

TABLE IV
SUMMARY OF COLIFORM DATA
MYRTLE BEACH STUDY-AUGUST 1972

STATION	TOTAL COLIFORM / 100 ML. MAXIMUM	MINIMUM	AVERAGE	MEAN	SAMPLES	FECAL COLIFORM / 100 ML. MAXIMUM	MINIMUM	AVERAGE	MEAN	SAMPLES
01	1300	170	850	700	7	110	20	66	59	7
02	3300	140	1400	950	7	80	20	44	37	7
03	35000	330	5700	2000	8	490	20	140	86	8
04	35000	490	5500	1700	8	1100	50	330	200	8
05	920000	1300	180000	27000	8	79000	130	11000	1300	8
06	350000	7900	150000	67000	8	4900	2300	3600	3400	8
07	1600000	3300	260000	53000	8	3300	200	1800	1400	8
08	92000	4900	34000	24000	8	2300	110	1000	690	8
09	240000	1000	37000	8700	8	1700	80	563	340	8
10	35000	790	8900	4300	8	790	170	430	370	8
11	14000	1300	5500	3800	8	790	210	460	410	8
12	17000	790	5900	4100	8	1700	170	630	480	8
13	22000	1300	8100	4700	8	1200	230	570	490	8
14	54000	1100	12000	5100	8	790	110	540	420	8
15	24000	940	6300	3600	8	790	80	410	310	8
16	7900	20	2300	510	8	490	<20	<170	<80	8
19	1800	<20	<650	<150	8	230	<20	<58	<36	8
30	2300	<20	<450	<140	8	130	<20	<51	<39	8
17	1300	<20	<300	<140	8	490	<20	<90	<40	8
21	1100	20	380	170	8	130	<20	<49	<39	8
22	790	50	290	190	8	80	<20	<39	<22	8
23	4900	170	1000	550	8	490	<20	<130	<79	8
18	1700	<20	<280	<84	8	310	<20	<59	<31	8
25	80	20	40	32	8	50	<20	<24	<22	8
26	140	<20	<73	<63	8	50	<20	<24	<22	8
27	1100	<20	<200	<74	8	50	<20	<24	<22	8
29	270	20	98	65	8	20	<20	<20	<20	8

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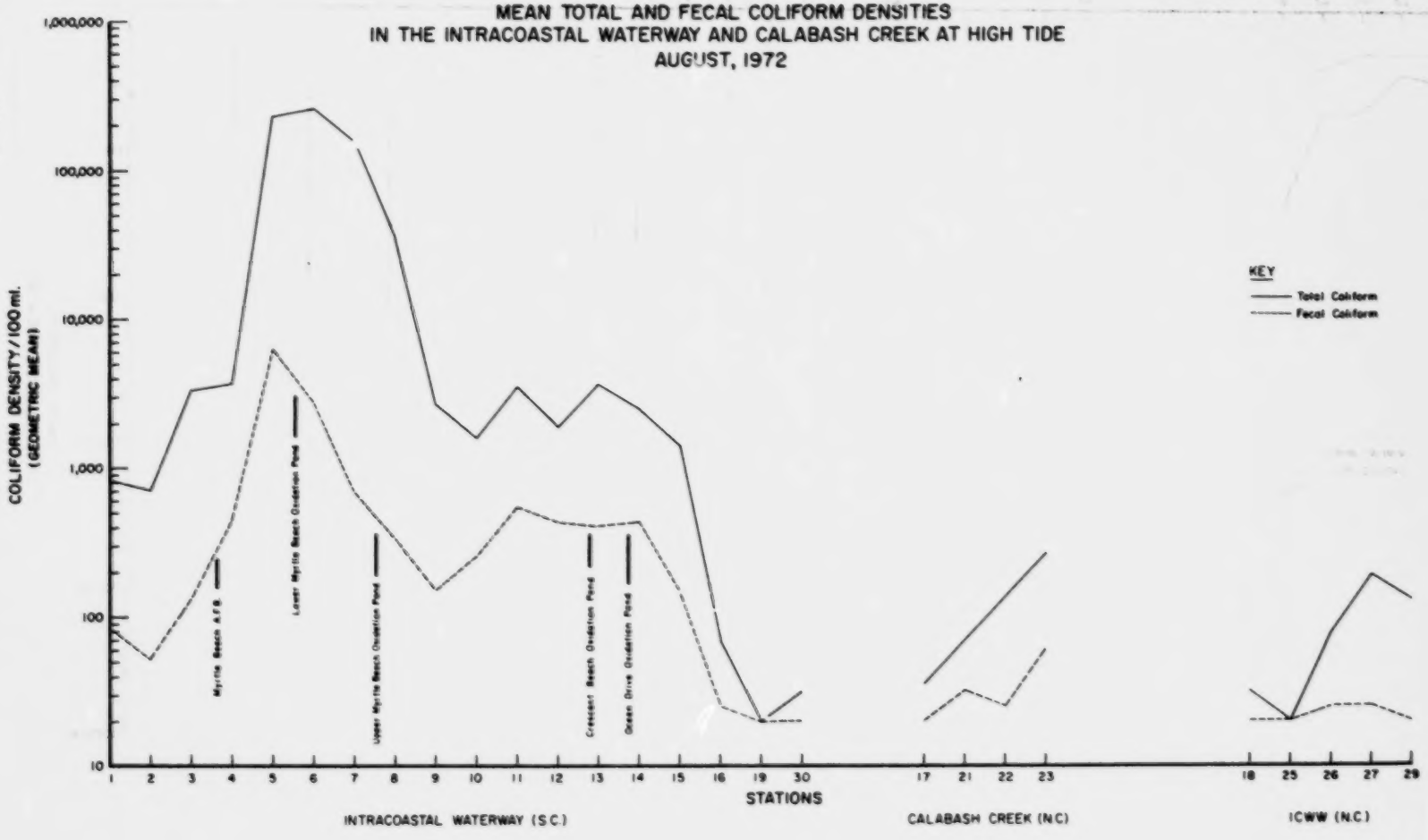
FIGURE 7
MEAN TOTAL AND FECAL COLIFORM DENSITIES
IN THE INTRACOASTAL WATERWAY AND CALABASH CREEK AT HIGH TIDE
AUGUST, 1972



slightly higher during August, while the mean fecal coliform density remained the same (Tables III and IV).

Between Stations 03 and 09, the mean total and fecal coliform densities ranged from 6 to 3,000 percent higher during August than during April (Figures 5 and 8). On occasion, persons were observed swimming immediately downstream (within 100 yards) from the Myrtle Beach Air Force Base STP outfall. Station 06, located downstream from the LMB-01 discharge, had mean total and fecal coliform densities of 67,000 and 3,400/100 ml, respectively. During the August sampling period, persons were observed swimming and water skiing approximately 1/4 to 1/2 mile downstream from the outfall.

Mean coliform densities increased slightly between Stations 12 and 14 as a result of the Crescent Beach and Ocean Drive pond discharges. The mean total coliform densities ranged from 4,100 to 5,100/100 ml in this reach of the waterway, while the mean fecal coliform densities ranged from 420 to 490/100 ml (Table IV and Figure 8). Downstream from Station 14 there was a continual decrease in both total and fecal coliform densities to <140 and <39/100 ml, respectively, as measured at the mouth of Little River Inlet (Station 30). A comparison of the high and low tide data shows a more pronounced dieoff of coliforms in the lower reaches of the waterway at high tide (Figures 6 and 7).

Intracoastal Waterway-N.C.: The mean coliform densities in this reach of the waterway were low as shown in Figure 8. Mean total and fecal coliform densities of <84 and <31/100 ml at Station 18 were the highest measured in this portion of the waterway during August.

Calabash Creek: The mean total and fecal coliform densities

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at the background station (23) were 550 and <79/100 ml, respectively (Table IV). These mean densities were somewhat lower than the densities measured during the April study (Table III). Downstream from Station 23, there was a significant decrease in the mean coliform densities as shown by mean total and fecal coliform densities of <140 and <40/100 ml, respectively, as measured at Station 17 (Figure 8).

Beach Water Quality Study

A limited study was conducted from August 30 to September 3 to determine the bacterial quality of selected swimming waters, stormwater discharges, streams and waste discharges along the beach areas of Myrtle Beach and North Myrtle Beach. Sampling station locations and descriptions are contained in Table I and are depicted in Figure 2.

Coliform data collected during the beach study are contained in Appendix B and summarized in Table V. Figures 9 and 10 depict the mean coliform concentrations at each station.

All stations were sampled at low tide to minimize the effects of saltwater on the discharges sampled. Most of the stations were sampled on five different days. Generally, flows from all of the storm sewers discharging to the beaches were minimal except during periods of rainfall. Although the flow was low at most of the discharges, mean coliform densities in these discharges were high. The majority of the storm sewers sampled had mean total and fecal coliform densities of greater than 10,000 and greater than 500/100 ml, respectively (Table V, Figures 9 and 10). Two stormwater discharges sampled, Stations 39 and 45, had mean total and fecal coliform concentrations of greater than 50,000 and greater than 10,000/100 ml, respectively. Following rainfall, total and

TABLE V
SUMMARY OF COLIFORM DATA
BEACH STUDY-SEPTEMBER 1972

STATION	LOW TIDE TOTAL COLIFORM / 100 ML. MAXIMUM	MINIMUM	AVERAGE	MEAN	SAMPLES	LOW TIDE FECAL COLIFORM / 100 ML. MAXIMUM	MINIMUM	AVERAGE	MEAN	SAMPLES
31	4900	700	2000	1500	5	700	80	320	250	5
32	240000	2200	51000	8300	5	3300	20	880	260	5
33	22000	20	11000	660	2	7000	20	3500	370	2
34	35000	3300	14000	11000	5	3300	130	1300	690	5
35	2300	20	640	240	5	1300	20	310	88	5
36	35000	4900	14000	11000	5	35000	2300	10000	5500	5
37	240000	33000	130000	100000	5	49000	11000	29000	24000	5
38	790	20	290	130	5	70	20	36	31	5
39	2400000	22000	580000	140000	5	170000	500	52000	12000	5
40	160000	1700	35000	6800	5	35000	20	7300	470	5
41	160000	2200	39000	12000	5	17000	310	4000	1200	5
42	92000	80	20000	1400	5	7000	20	1400	110	5
43	1100	20	250	69	5	110	20	38	28	5
44	130000	11000	62000	42000	5	79000	1700	19000	5900	5
45	350000	17000	120000	70000	5	130000	1100	35000	13000	5
46	54000	1700	13000	4900	5	7000	20	1500	180	5
47	54000	7900	22000	17000	5	4900	230	1700	900	5
48	330	20	130	68	5	70	20	30	26	5
49	130000	1300	38000	10000	5	35000	500	11000	4200	5
50	130000	18000	57000	46000	5	17000	790	4500	2000	5
51	13000	2200	6800	4900	5	790	170	310	250	5
52	1300	790	1100	1100	5	1300	20	590	320	5
53	120000	4900	35000	16000	5	1700	20	450	180	5
54	1600000	14000	440000	120000	5	23000	700	6500	2900	5
55	1800	330	710	580	5	460	50	160	110	5
56	70	20	34	30	5	70	20	30	26	5
57	490	20	140	64	5	20	20	20	20	5
58	540000	2300	130000	21000	5	350000	330	81000	6700	5
59	230	20	97	57	3	40	20	27	25	3
60	90	80	87	87	3	20	20	20	20	3
61	2200	20	900	280	3	50	20	30	27	3

FIGURE 9
MEAN TOTAL COLIFORM DENSITIES AT ALL BEACH STUDY STATIONS
SEPTEMBER, 1972

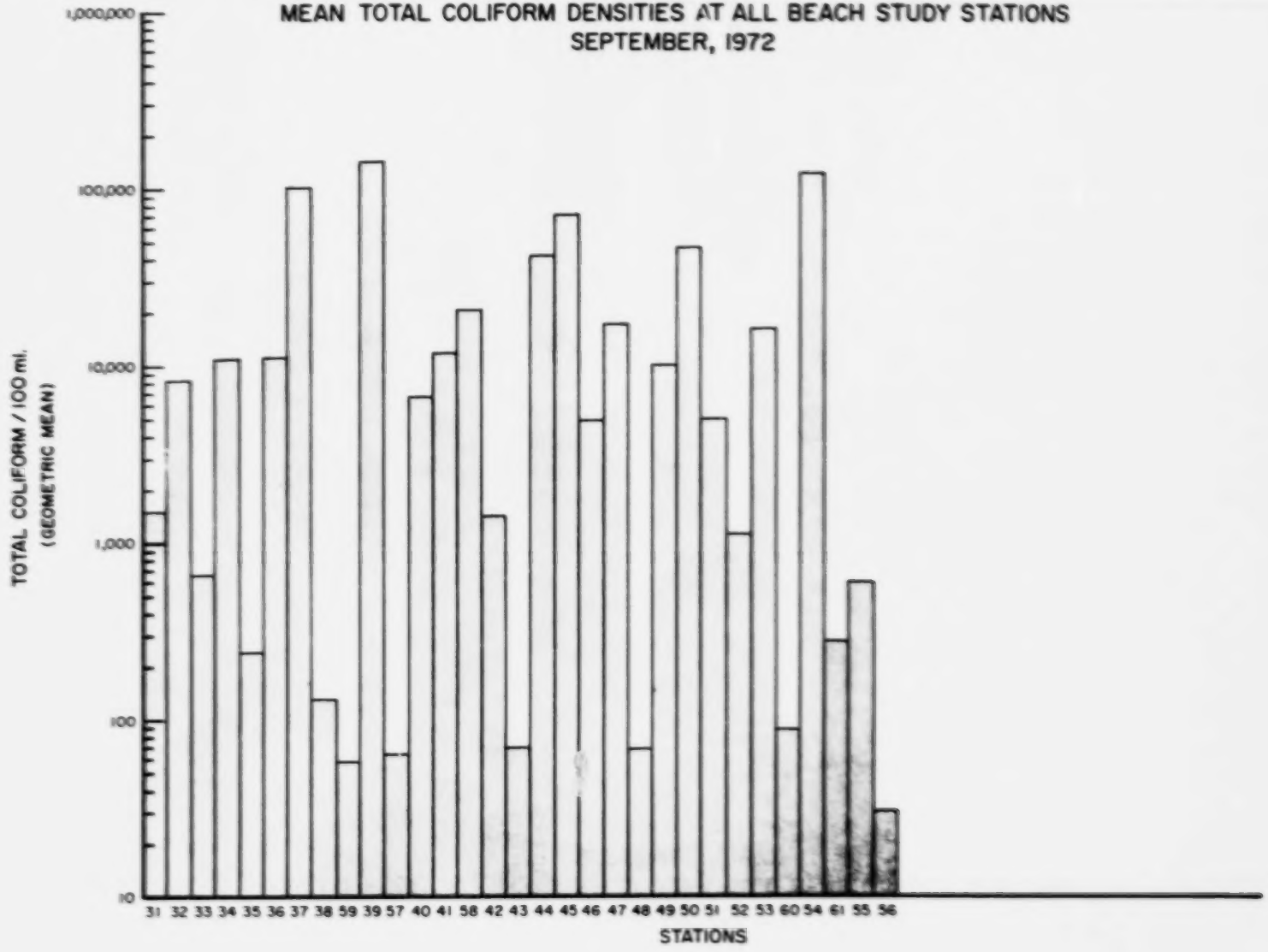
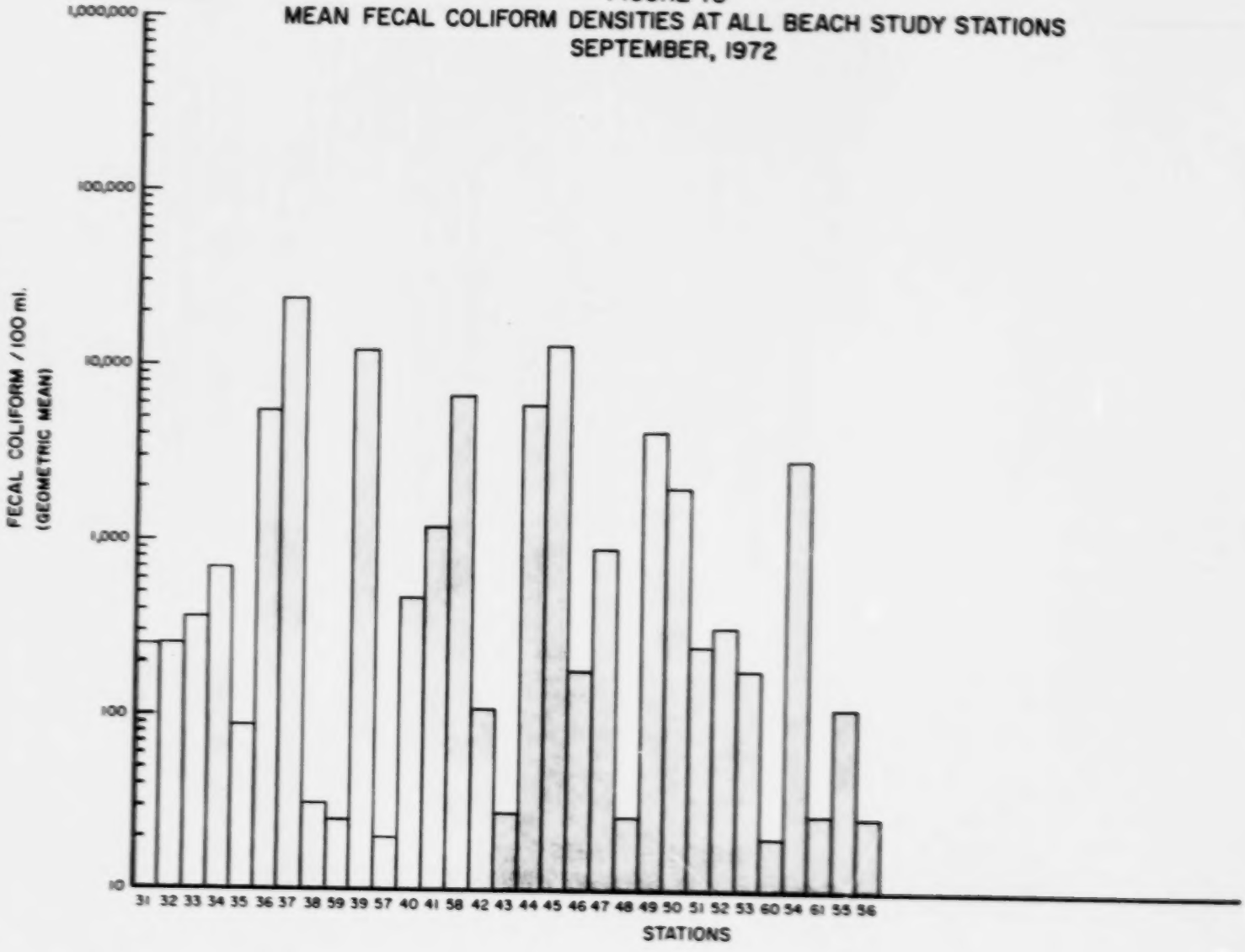


FIGURE 10
MEAN FECAL COLIFORM DENSITIES AT ALL BEACH STUDY STATIONS
SEPTEMBER, 1972



fecal coliform densities at several of the stormwater discharges were greater than 100,000/100 ml.

During dry periods, flows from most of the stormwater discharges were insignificant in their impact on the bacterial quality of the receiving beach waters. During periods of runoff, however, these stormwater discharges can serve as significant sources of bacterial contamination to the beach waters.

Many of the stormwater discharges create small pools and streams along the beach. These discharges represent potential sources of pathogenic bacteria and serve as attractive places for small children to dabble and play. On numerous occasions, children were observed playing directly in these stormwater pools.

The bacterial quality of several creeks and swashes tributary to the beaches was determined. Mean total coliform densities ranged from 580 to 100,000/100 ml and the mean fecal coliform densities ranged from 110 to 24,000/100 ml. Deephead and Cane Patch Swashes (Stations 49 and 50) had mean total coliform densities in excess of 9,900/100 ml and mean fecal coliform densities greater than 2,000/100 ml (Table V, Figures 9 and 10). An upstream station (37), located on Withers Swash, had mean total and fecal coliform densities of 100,000 and 24,000/100 ml. Downstream from Station 37, the mean total and fecal coliform densities were 11,000 and 5,500/100 ml as measured at Station 36.

Several of the swashes sampled were contributing significant bacterial contamination to the recreational areas. Withers Swash receives significant fecal contamination upstream from the Broadway Street bridge. The source of this fecal contamination was not determined; however, the

stream flows through some unsewered areas and septic tank seepage may be a possible source of this contamination.

The bacterial water quality of eight surf stations was determined. The majority of the surf stations had mean total coliform densities of less than 100/100 ml and mean fecal coliform levels of less than 35/100 ml (Table V and Figures 9 and 10). These low coliform densities were within the recommended standards for primary contact recreational waters.(5) Stations 35, 38, and 61 had mean total coliform densities that exceeded 100/100 ml, while only Station 35 had a mean fecal coliform density that exceeded 35/100 ml.

During a period of rainfall, the bacterial water quality of some surf stations was affected. Total and fecal coliform densities of 2,300 and 1,300/100 ml were measured at Station 35 during a rainfall period.

The effluents of two domestic waste treatment facilities that discharge to the Atlantic Ocean were sampled during the beach study. These facilities were located at the Holiday Inn Travel Park and Lake Arrowhead Campground. The Holiday Inn facility consists of a 0.1 MGD package treatment plant with chlorination and a 7-day holding pond with a discharge ditch directly to the ocean. The Lake Arrowhead Campground treatment facility consists of three oxidation ponds with chlorination. The oxidation pond effluent is discharged into a freshwater lake and, in turn, into the ocean. Both the Holiday Inn and Lake Arrowhead discharges were sampled at the point of discharge to the beach.

The effluent from the Holiday Inn treatment plant (Station 54) had mean total and fecal coliform densities of 120,000 and 2,900/100 ml, respectively. The impact of the discharge on the bacterial quality

of the receiving water, however, did not appear to be significant as measured at Station 61 (Table V, Figures 9 and 10).

Although mean coliform densities in the receiving surf waters were not significantly elevated as a result of the discharge, the manner in which the effluent is discharged raises some serious questions. The discharge of a secondary effluent onto a recreational beach which affords direct recreator contact should not be allowed.

The waste treatment discharge from the Lake Arrowhead Campground had mean total and fecal coliform densities of 16,000 and 180/100 ml, respectively (Table V and Figures 9 and 10). Although the coliform densities were not as high in the Lake Arrowhead effluent as for the Holiday Inn Travel Park, the same general questions are raised in regard to the manner of discharge and recreator safety.

Salmonella Results

In addition to total and fecal coliform determinations, attempts were made to isolate members of the genus Salmonella at selected stations during the April and August study periods. Isolation and identification procedures used in the studies are described in the Study Methods section of this report (Appendix A).

During the April study, swabs were retrieved from 14 stations in the Intracoastal Waterway and Calabash Creek. Salmonella enteriditis serotypes were isolated from 9 of the stations sampled (Table VI). Table VII shows a comparison of the mean fecal coliform densities measured during the time the swabs were suspended at a station with the number of serotypes isolated. Salmonella were isolated at every station sampled where the mean fecal coliform density was 120/100 ml or greater and at one station where the mean fecal coliform density was only 34/100 ml.

Table VI

List of Sampling Stations for *Salmonella* Serotypes Isolated During the April and August Studies

Station	*Salmonella enteriditis* Serotypes Isolated	
	April Study	August Study
02	ser* Muenchen ser Hartford	ser Rubislaw ser Gaminara
03	Swab not recovered	ser Gaminara
04	ser Muenchen, ser Heidelberg	Swab not recovered
07	ser Alachua, ser P$_{38}$,k,-	Swab not recovered
08	ser Meleagridis, ser Muenchen, ser Braenderup	Swab not recovered
09	ser Meleagridis, ser Alachua, ser Montevideo	Swab not recovered
10	ser Senftenberg, ser Alachua, ser Montevideo	Swab not recovered
11	ser Muenchen, ser Senftenberg, ser Oranienburg, ser Gaminara	ser Newport
14	ser Kottbus, ser Muenchen, ser Kimsbuettel	Swab not recovered
15	Swab not recovered	None isolated
16	ser Muenchen	Swab not recovered
17	Swab not recovered	None isolated
19	None isolated	Swab not recovered
20	None isolated	Swab not recovered
21	ser rough**	Swab not recovered
22	None isolated	Swab not recovered
23	Swab not recovered	None isolated
27	None isolated	Swab not recovered
29	Swab not recovered	None isolated
AFB-01	Isolation not attempted	None isolated
LMB-01	Isolation not attempted	ser Newport, ser Bredeney
UMB-01	Isolation not attempted	ser Anatum
CB-01	Isolation not attempted	ser Gaminara, ser Kottbus
CD-01	Isolation not attempted	ser Kottbus

* Serotype
** Culture was rough. "O" antigens could not be identified.

Table VII

Comparisons of Fecal Coliform Densities and Numbers of Salmonella enteriditis Serotypes Isolated During the April Study

Station	Fecal Coliforms Per 100 ml 1/	Mean Fecal Coliforms Per 100 ml 2/	Numbers of Salmonella enteriditis Serotypes Isolated
02	50	43	2
04	<20	48	2
07	1,700	1,600	2
08	1,300	510	3
09	330	330	3
10	330	330	3
11	170	120	4
14	23	120	3
16	130	77	1
19	50	20	0
20	330	94	0
21	40	34	1
22	80	40	0
27	<20	27	0

1/ Fecal coliform density at station on day of swab retrieval

2/ Geometric mean of the fecal coliform density at station during the swab sampling period

During the August study period, only seven swabs were retrieved from the Intracoastal Waterway and Calabash Creek. Salmonella were isolated at three of the seven stations where swabs were retrieved (Table VI).

Attempts were made to isolate Salmonella at the five waste sources sampled during August. Isolations were made from four of the five waste sources sampled, with a total of six different serotypes being isolated (Table VI).

A total of 17 different serotypes were isolated from environmental and wastewaters during both the April and August studies. The fact that a variety of Salmonella were isolated from these environmental waters constitutes further evidence of fecal pollution and the disease-producing potential of these waters.

CHEMICAL AND PHYSICAL RESULTS

Chloride Distribution

Average surface chloride concentrations were determined at all water quality stations and average bottom chloride concentrations were determined at selected stations. Chloride results are summarized in Table VIII and depicted in Figures 11, 12, and 13.

Background chloride concentrations in the Intracoastal Waterway ranged from 10 to 12 mg/1, as measured at Station 01. Chloride concentrations near the mouth of Little River Inlet ranged from 7,950 to 17,500 mg/1 (Table VIII).

During the April study, maximum saltwater intrusion at high tide into the waterway from Little River Inlet extended approximately as far south as Station 14 (Figure 11). The intrusion of high chloride levels

Table VIII

AVERAGE CHLORIDE CONCENTRATION* DURING APRIL AND AUGUST 1972

Station	April 1972				August 1972			
	High Tide		Low Tide		High Tide		Low Tide	
	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
01	12	11	10	11	10	11	9	9
02	12	--	10	--	9	--	9	--
03	10	--	11	--	9	--	10	--
04	10	--	11	--	10	--	8	--
05	11	10	11	12	10	12	9	9
06	10	--	11	--	12	--	10	--
07	11	--	45	--	13	--	11	--
08	12	--	10	--	12	--	11	--
09	11	--	17	--	13	--	11	--
10	11	--	11	--	13	16	12	11
11	17	--	11	--	30	26	11	12
12	12	--	13	--	52	50	11	13
13	24	26	13	15	1,580	1,790	16	19
14	51	--	11	--	4,280	5,590	27	29
15	216	--	16	--	8,650	14,100	448	459
16	3,650	--	43	--	17,600	19,300	4,640	6,500
17	14,100	--	6,030	--	18,700	19,400	11,900	13,000
18	17,300	17,500	11,100	14,800	19,400	19,500	15,100	18,000
19	17,500	--	7,950	--	19,600	19,600	13,200	16,000
20	11,600	--	3,600	--	--	--	--	--
21	13,100	--	6,850	--	18,700	19,300	12,100	12,400
22	11,000	--	7,280	--	16,900	18,800	11,100	11,200
23	9,150	--	2,650	--	14,700	16,400	8,830	9,000
25	15,300	--	14,400	--	19,100	19,400	18,000	18,600
26	12,900	--	15,700	--	18,300	18,800	19,000	19,100
27	12,900	--	16,000	--	17,200	18,100	18,900	19,400
29	15,200	16,900	16,500	16,900	17,400	18,700	19,100	19,100
30	--	--	--	--	19,400	19,400	15,600	15,700

* mg/l

FIGURE 11
AVERAGE SURFACE CHLORIDE CONCENTRATIONS
IN THE INTRACOASTAL WATERWAY AND CALABASH CREEK AT HIGH & LOW TIDES
APRIL, 1972

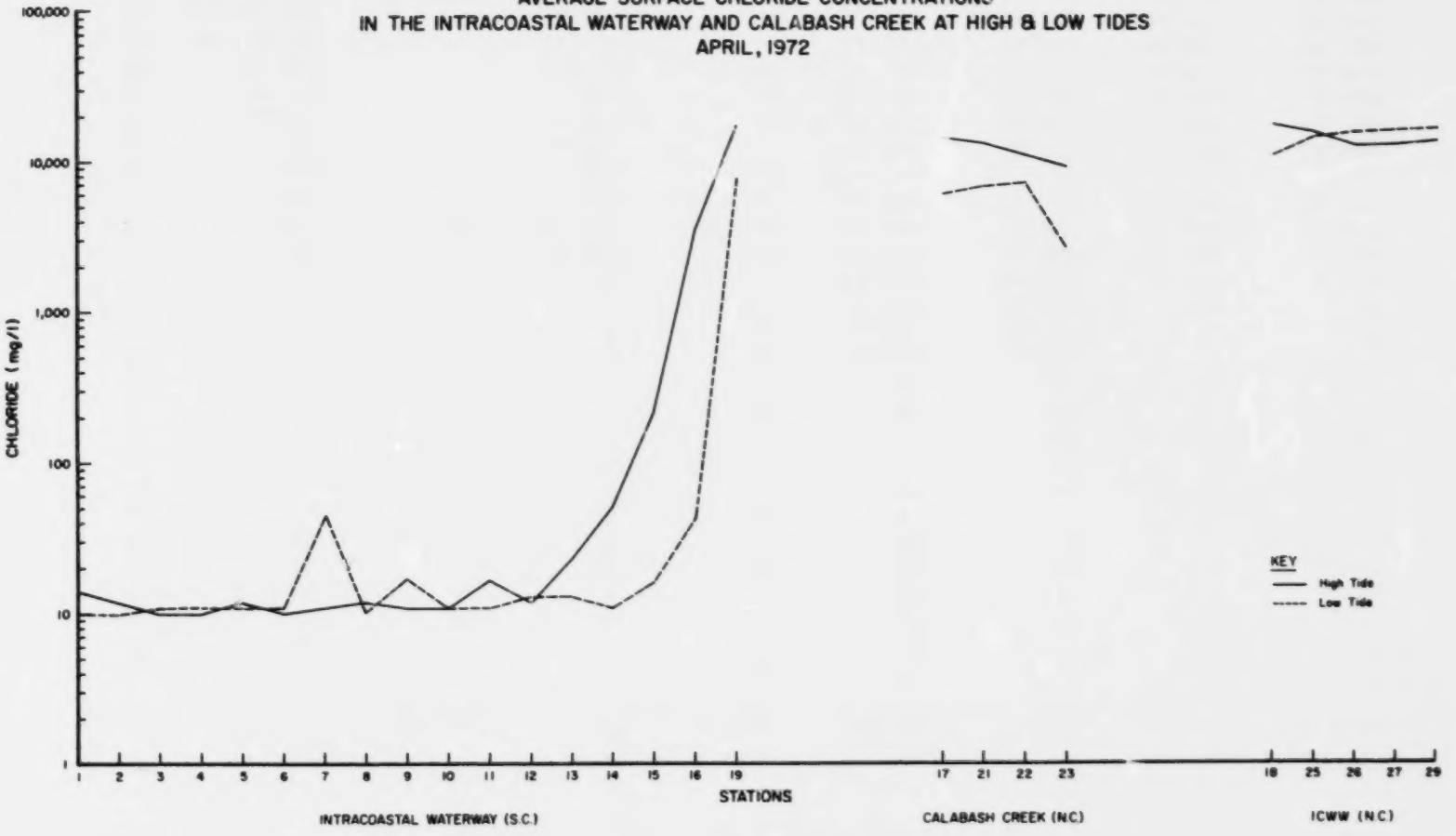


FIGURE 12
AVERAGE SURFACE CHLORIDE CONCENTRATIONS
IN THE INTRACOASTAL WATERWAY AND CALABASH CREEK AT HIGH & LOW TIDES
AUGUST, 1972

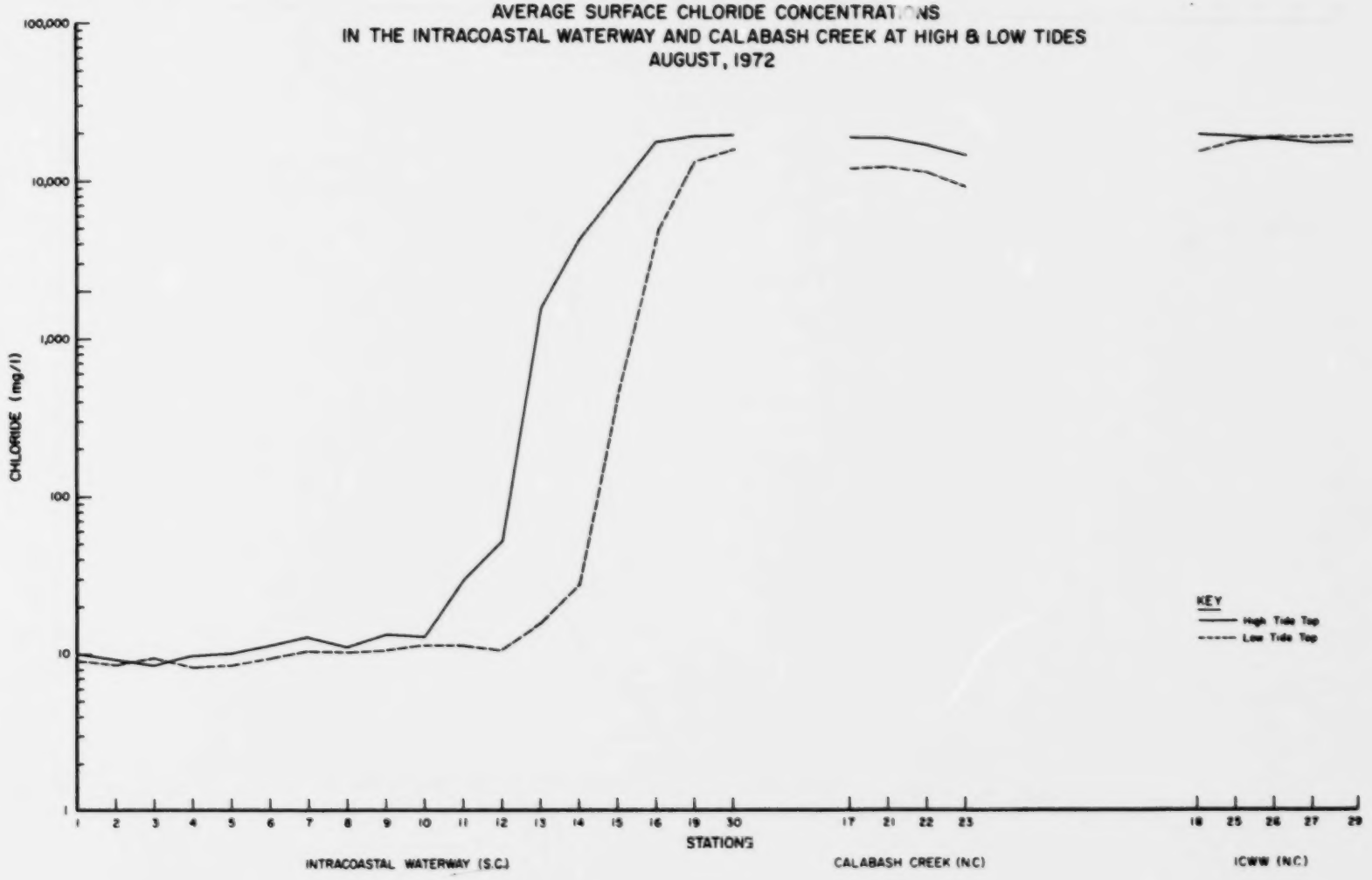
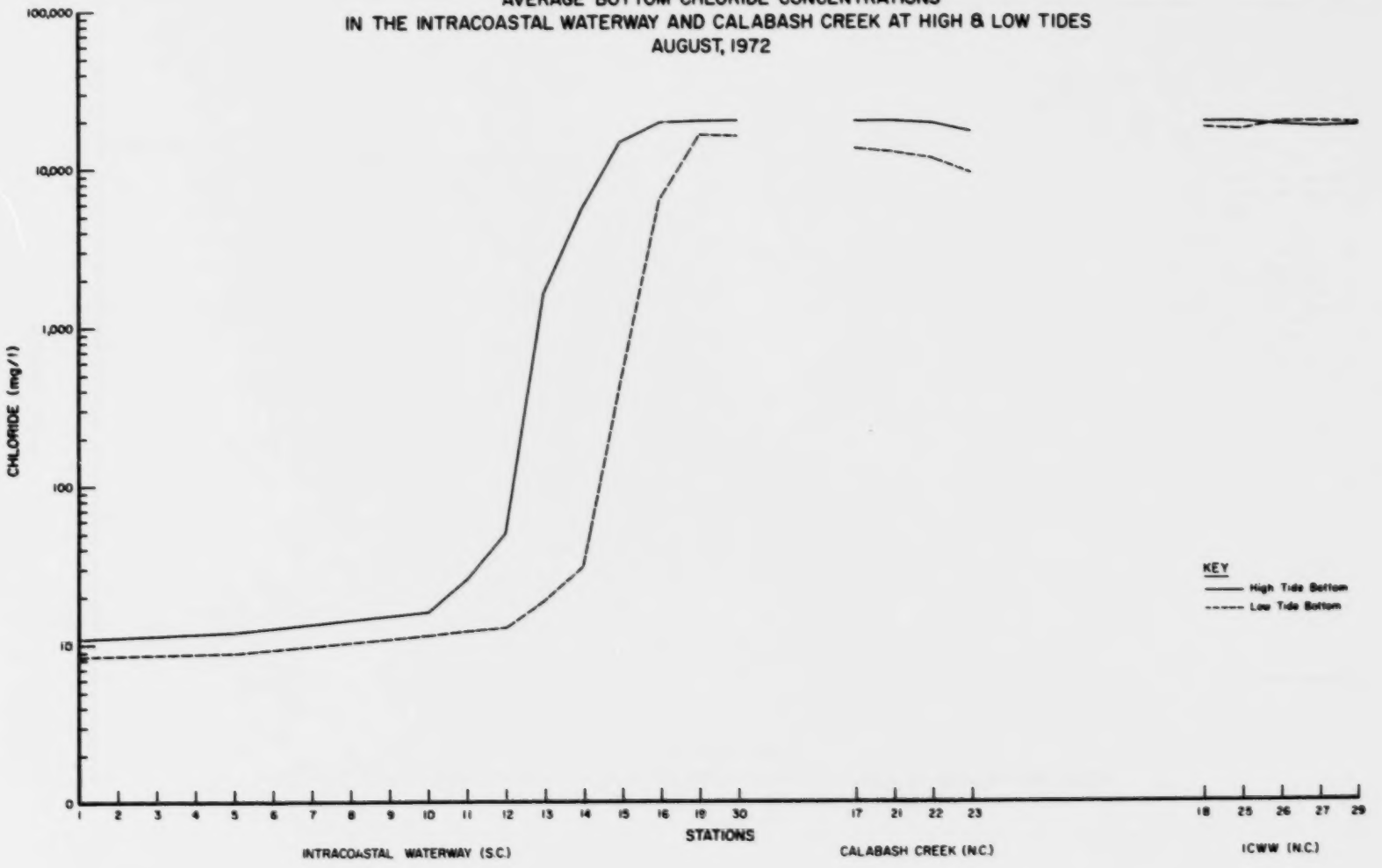


FIGURE 13
AVERAGE BOTTOM CHLORIDE CONCENTRATIONS
IN THE INTRACOASTAL WATERWAY AND CALABASH CREEK AT HIGH & LOW TIDES
AUGUST, 1972



into the waterway, south of Little River Inlet, decreases rather rapidly with distance from the inlet. The increase in chloride concentrations at those stations downstream from Station 15 (Highway 17 bridge) resulted in a corresponding sharp decrease in coliform levels in this reach of the waterway.

In April, the chloride concentrations in Calabash Creek and the Intracoastal Waterway in North Carolina were indicative of brackish systems (Table VIII, Figure 11). Average low tide chloride concentrations ranged from 2,650 to 6,030 mg/l at the Calabash Creek stations. Average low tide chloride concentrations in the Intracoastal Waterway in North Carolina ranged from 11,100 to 16,500 mg/l.

During the August study period, chloride concentrations in the South Carolina Intracoastal Waterway were generally higher than the concentrations measured in April (Table VIII). As shown in Figures 12 and 13, maximum saltwater intrusion extended between Stations 12 and 13.

Chloride concentrations in August in Calabash Creek and Intracoastal Waterway in North Carolina were slightly higher than measured in April at the same stations (Table VIII and Figures 12 and 13).

Temperature

During the April study, average water temperature in the Intracoastal Waterway ranged from 18.8°C at Station 19 to 21.3°C at Stations 11 and 12 (Appendix B). Calabash Creek had average water temperatures that ranged from 19.9°C at Station 17 to 22.0°C at Station 23.

The average water temperature in the Intracoastal Waterway during the August study period ranged from 27.6°C at Station 01 to 29.3°C at

Stations 07 and 14. Average water temperatures in Calabash Creek ranged from 28.7°C at Station 17 to 29.3°C at Station 23 (Appendix B).

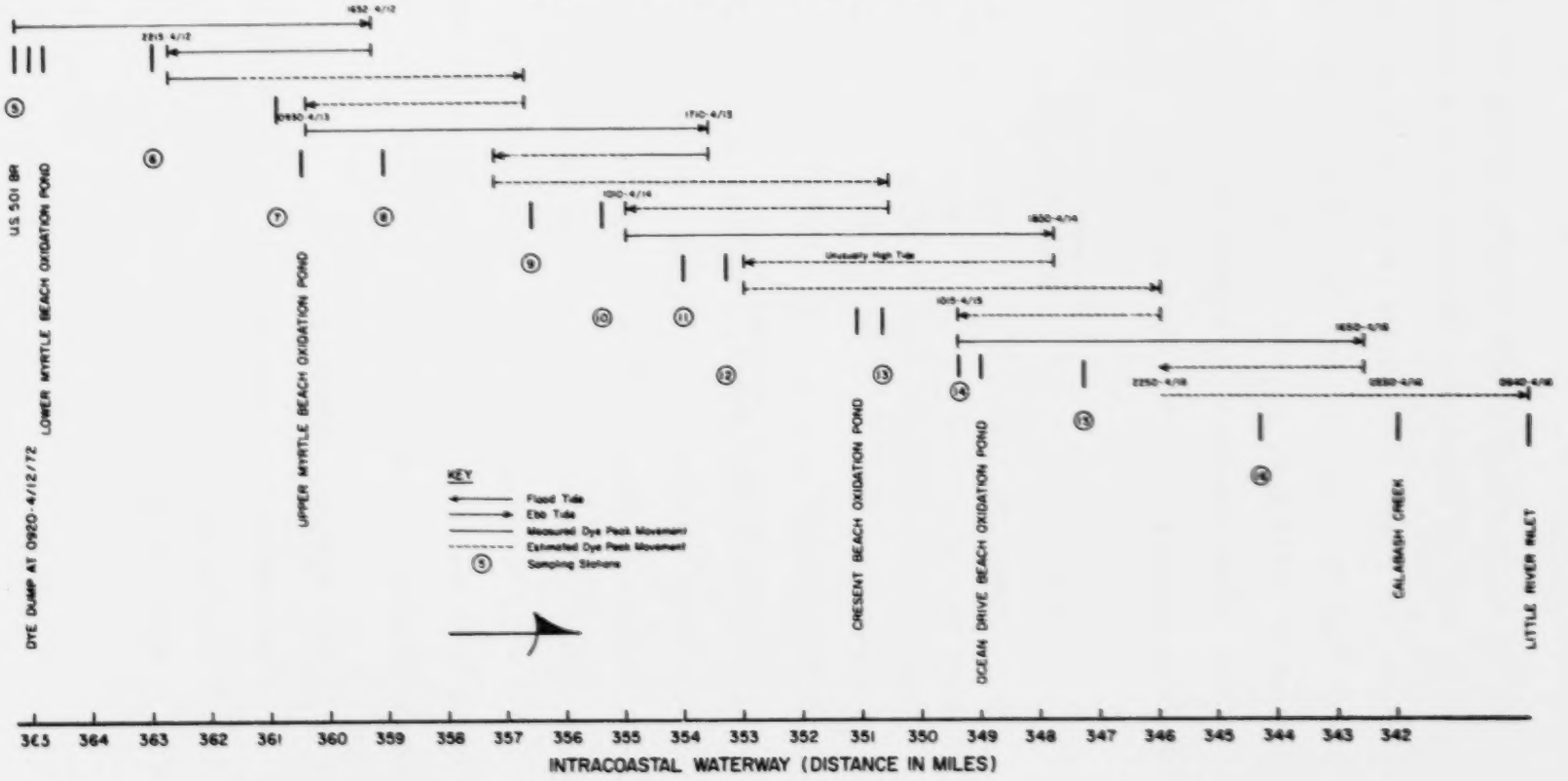
Water Movement Study

To estimate time of travel from the vicinity of the areas largest waste source (LMB-01) to Little River Inlet, Rhodamine dye was dumped into the waterway at the U. S. Highway 501 bridge just after high water slack (HWS) on April 12, 1972. Subsequent dye movement is shown in Figure 14.

Accurate predictions of dye location on successive high and low water slacks (HWS-LWS) were possible after monitoring dye movement through the first tidal cycle. This was done by assuming that the ebb and flood tide velocities of 0.9 and 0.6 statute miles per hour, measured during the first cycle, were representative of the entire reach. Although not precise, it did enable prediction of the peak location within 0.5 statute miles. Actual locations were verified on or near HWS and LWS once each day (during daylight) until the dye reached Calabash Creek. The predicted peak location was in error only once. During the night of April 14-15, an unusually high flood tide moved the dye peak 5 statute miles upstream as compared to the usual 3 1/2 statute miles.

On April 15 (LWS), the dye peak was 0.6 statute miles south of Calabash Creek and traces of dye were detected in Little River (Figure 14). Using the assumptions discussed previously, it was predicted that the next flood tide would last 6 hours, that the peak would move 3.6 statute miles south and that dye would move into Calabash Creek and across the South Carolina-North Carolina state line. Peak movement was not verified,

FIGURE 14
DYE MOVEMENT
INTRACOASTAL WATERWAY
U.S. HIGHWAY 501 BRIDGE TO LITTLE RIVER INLET


DYE DUMP AT 0920-4/12/72
US 501 BR
LOWER MYRTLE BEACH OXIDATION POND
UPPER MYRTLE BEACH OXIDATION POND
CRESENT BEACH OXIDATION POND
OCEAN DRIVE BEACH OXIDATION POND
CALABASH CREEK
LITTLE RIVER INLET
KEY
Flood Tide
Ebb Tide
Measured Dye Peak Movement
Estimated Dye Peak Movement
Sampling Stations
365 364 363 362 361 360 359 358 357 356 355 354 353 352 351 350 349 348 347 346 345 344 343 342
INTRACOASTAL WATERWAY (DISTANCE IN MILES)

but the dye was traced into North Carolina showing that wastewater discharged into the Intracoastal Waterway in South Carolina could cross the state line (Figure 14). During the following ebb tide, the peak moved through the inlet into the ocean. Total travel time from dye injection to Little River Inlet was 92 hours.

Travel times from the U. S. Highway 501 bridge and from each wastewater discharge to Little River Inlet were:

Location	Distance to Inlet (Statute Miles)	Travel Time (Hours)
U. S. Highway 501 bridge	25.3	92
Lower Myrtle Beach Pond	24.8	90
Upper Myrtle Beach Pond	20.4	74
Crescent Beach Pond	11.2	40
Ocean Drive Pond	9.0	32

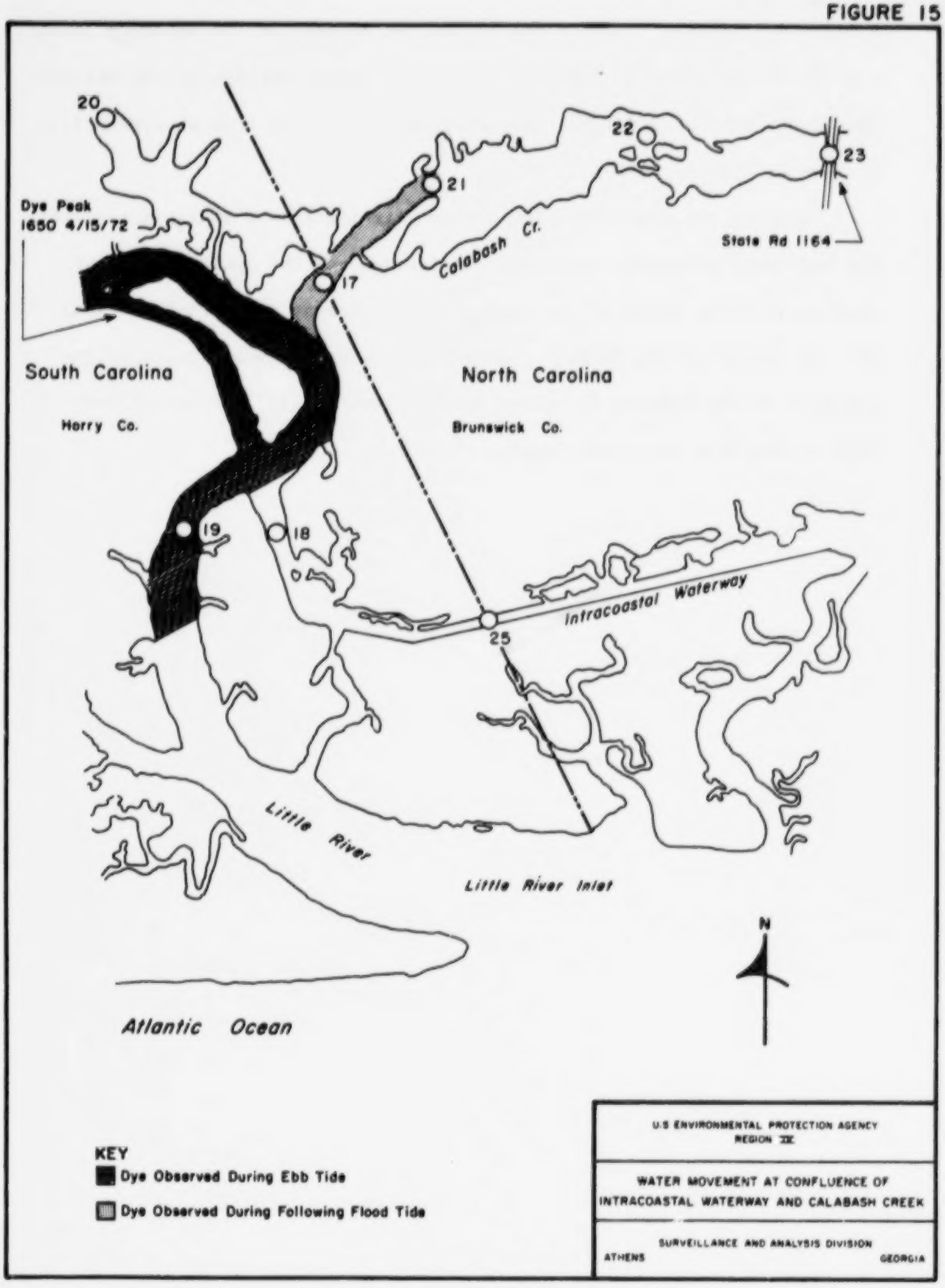
Although these times are for a specific study, it is doubtful that they would vary significantly except under extreme tidal variations and freshwater flow conditions. Water movement in the vicinity of Little River Inlet and Calabash Creek is shown in Figure 15.

Net water movement in the Intracoastal Waterway north of Enterprise Landing is in the direction of Little River Inlet, as verified by the dye and chloride measurements.

WATER QUALITY STANDARDS COMPLIANCE

The need exists for stream reclassification on the part of the state of South Carolina within the study area. According to the classification filed in 1956, the saltwater portion of the Intracoastal Waterway carries

FIGURE 15


20
22
23
21
Dye Peak
1650 4/15/72
State Rd 1164
Calabash Cr.
17
South Carolina
North Carolina
Horry Co.
Brunswick Co.
19
18
Intracoastal Waterway
25
Little River
Little River Inlet
N
Atlantic Ocean
KEY
Dye Observed During Ebb Tide
Dye Observed During Following Flood Tide
U.S ENVIRONMENTAL PROTECTION AGENCY
REGION IX
WATER MOVEMENT AT CONFLUENCE OF
INTRACOASTAL WATERWAY AND CALABASH CREEK
SURVEILLANCE AND ANALYSIS DIVISION
ATHENS
GEORGIA

a Class A designation, while the freshwater portion of the waterway carries a Class SA designation. Obviously, the freshwater portion of the waterway should not be classified for shellfishing, but should have an appropriate freshwater classification.

Applying the South Carolina Stream Classifications outlined earlier, the bacterial standards were violated during both the April and August studies for that reach of the Intracoastal Waterway classified as Class SA. Violation of the Class A standard in the waterway was noted in the vicinity of the Highway 17 bridge and the town of Little River at low tide during both April and August.

LIST OF REFERENCES

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11. Methods for Chemical Analysis of Water and Wastes: U. S. Environmental Protection Agency, (1971).

STUDY METHODS

WATER QUALITY SAMPLING

Bacteriological sampling: All samples collected for bacteriological analyses were collected at a depth of approximately one foot using a grab technique. All samples were collected in sterile glass containers and placed on ice until time of analysis. All analyses were initiated within six hours of sample collection.

Water quality stations were sampled at both high and low slack tides. A minimum of four samples were collected at each station on both high and low slack tide during each of the studies.

Selected water quality stations were sampled for the presence of Salmonella. Samples obtained for the purpose of isolating Salmonella were collected using a modification of the technique of Moore.(6) Sterile sanitary napkins (swabs) were suspended beneath the water surface for three days, retrieved, and returned to the laboratory for analysis.

Chloride sampling: Surface samples were collected at each water quality station and analyzed for chloride concentration. Additional chloride samples were collected approximately one foot from the bottom at selected stations using a Kemmerer sampler.

WATER MOVEMENT STUDY

Time of travel and water movement in a portion of the Intracoastal Waterway was determined using Rhodamine dye. Fifteen gallons of Rhodamine WT dye (20% w/v) were dumped into the waterway at high slack

tide, and the dye cloud was traced using visual and fluorometric methods. A boat-mounted, continuous flow-through fluorometer was used to monitor dye movement.

WASTE SOURCE SAMPLING

Oxidation pond and treatment plant effluents were grab sampled hourly over a 12-hour period on two different days during each study period. Hourly samples were composited every three hours and analyzed for total and fecal coliform densities. Samples were maintained in an iced condition until analysis. All analyses were initiated within six hours after collection.

Bacterial samples from chlorinated effluents were dechlorinated immediately using sterile sodium thiosulfate. Hourly total residual chlorine concentrations were determined for all chlorinated effluents during the compositing periods.

Effluent flows were determined using several methods. Where available, flow metering equipment was used to obtain an instantaneous hourly flow and a flow for the compositing periods. Where no flow measuring equipment was available, flow was determined using either hourly weir readings, instantaneous volume measurement or cross sectional stream gaging using a current meter. None of the oxidation ponds sampled had adequate flow measuring equipment.

ANALYTICAL PROCEDURES

Bacteriological examination: Total coliform determinations were made using the standard procedure outlined in Standard Methods (7) for the five tube MPN procedure. This method employs Lauryl Tryptose Broth

incubated at 35° ± 0.5°C for 24 and 48 ± 3 hours, followed by confirmation using Brilliant Green Lactose Bile Broth incubated at the same temperature and for the same length of time.

Fecal coliform densities were determined using the five-tube MPN procedure outlined in Standard Methods.(7) This method employs the standard presumptive test followed by fecal coliform confirmation using EC Medium at an elevated temperature (44.5° ± 0.2°C, waterbath) for 24 ± 2 hours.

Swabs used for Salmonella isolation were inoculated into wide-mouthed jars containing 250 ml of 1 1/2 strength Tetrathionate Broth with brilliant green dye added. Inoculated swabs were incubated for 24 and 48 hours at 41.5° ± 0.5°C according to the procedure of Spino.(8) Following either primary or subculture enrichment, an inoculum was streaked onto Xylose Lysine Desoxycholate Agar (XLD) and Hektoen Enteric Agar (HE) plates and incubated for 18-24 hours at 35° ± 0.5°C. Suspect Salmonella colonies were picked and subjected to the identification scheme outlined in Table IX.

The methods and media outlined in Table IX are described by Ewing (9), with the exception of the cytochrome oxidase method. Oxidase presence was determined using Patho-Tec-CO reagent strips.

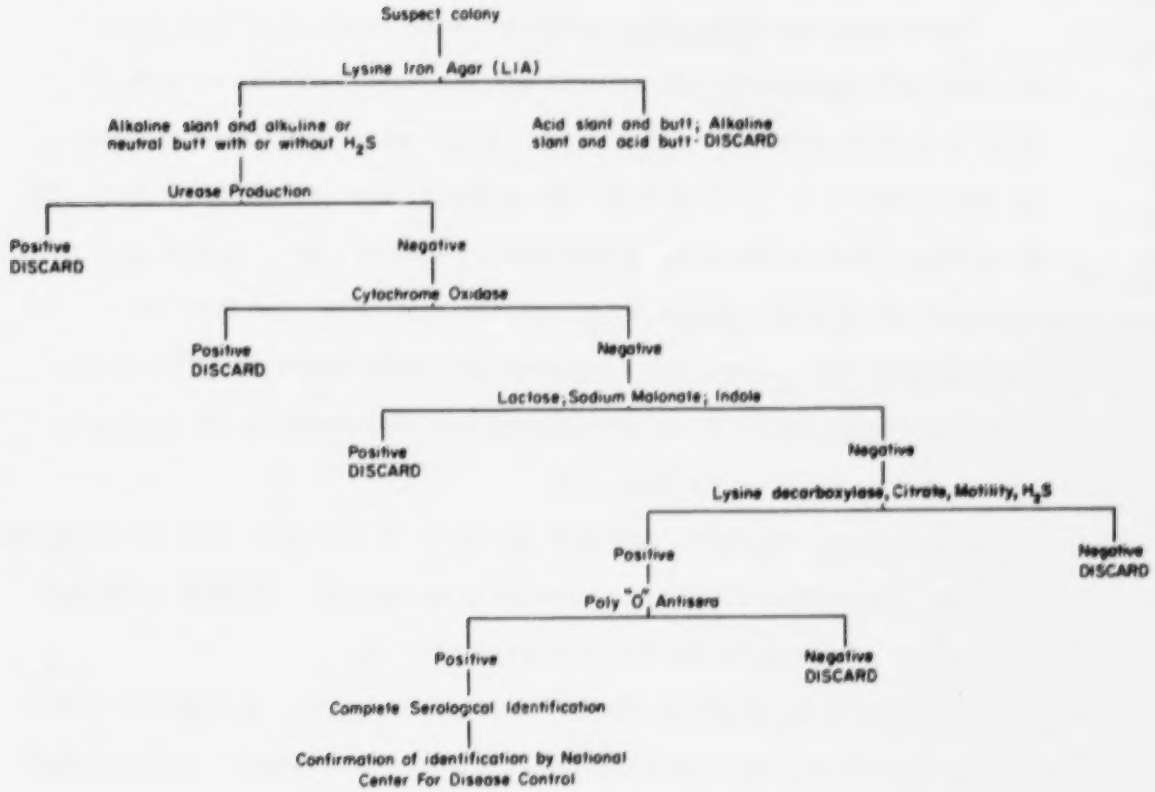
Definitive serological identifications of Salmonella isolates were made using the standard serological procedures described by Edwards and Ewing (10).

Chemical Methods: Chloride concentration in water quality samples was determined using the EPA automated ferricyanide method (11).

Total residual chlorine concentrations of effluent samples were determined using the Black-Whittle method.

TABLE IX

IDENTIFICATION SCHEME FOR SALMONELLA SUSPECTS



APPENDIX B

PHYSICAL, CHEMICAL AND MICROBIOLOGICAL DATA

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL-AUGUST, 1972)

AGENCY PRIMARY STATION	SECONDARY	SECONDARY	STATION LOCATION	STATE	MINOR BASIN
1113>050					
450801	01	SC-051-01	I WATERWAY-ENTERPRISE LANDING	SOUTH CAROLINA	LOWER PEE DEE RIVER
450802	02	SC-051-02	I WATERWAY-SOCASTEE BRIDGE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450803	03	SC-051-03	I WATERWAY-HAGUE MARINA	SOUTH CAROLINA	LOWER PEE DEE RIVER
450804	04	SC-051-04	I WATERWAY-MYRTLE B AF BASE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450805	05	SC-051-05	I WATERWAY-HIGHWAY 501	SOUTH CAROLINA	LOWER PEE DEE RIVER
450806	06	SC-051-06	I WATERWAY-DOWN MYRTLE B OUTFALL	SOUTH CAROLINA	LOWER PEE DEE RIVER
450807	07	SC-051-07	I WATERWAY-OLD OUTFALL LINE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450808	08	SC-051-08	I WATERWAY-NW MYRTLE#OOD GOLF CE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450809	09	SC-051-09	I WATERWAY-AT MILE 15.0	SOUTH CAROLINA	LOWER PEE DEE RIVER
450810	10	SC-051-10	I WATERWAY-AT MILE 13.7	SOUTH CAROLINA	LOWER PEE DEE RIVER
450811	11	SC-051-11	I WATERWAY-MYRTLE BEACH MANOR	SOUTH CAROLINA	LOWER PEE DEF RIVER
450812	12	SC-051-12	I WATERWAY-BRIARCLIFF MARINA	SOUTH CAROLINA	LOWER PEE DEE RIVER
450813	13	SC-051-13	I WATERWAY-NR AIRPORT	SOUTH CAROLINA	LOWER PEE DEE RIVER
450814	14	SC-051-14	I WATERWAY-DOWN OCEAN BEACH OUTF	SOUTH CAROLINA	LOWER PEE DEE RIVER
450815	15	SC-051-15	I WATERWAY-ST HWY 9 BWIDGE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450816	16	SC-051-16	I WATERWAY-LITTLE RIVER DOCK	SOUTH CAROLINA	LOWER PEE DEE RIVER
450817	17	SC-051-17	I WATERWAY-AT LITTLE RIVER	SOUTH CAROLINA	LOWER PEE DEE RIVER
450818	18	SC-051-18	I WATERWAY-AT LITTLE RIVER INLET	SOUTH CAROLINA	LOWER PEE DEE RIVER
450819	19	SC-051-19	I WATERWAY-MULLET CREEK	SOUTH CAROLINA	LOWER PEE DEE RIVER
450820	20	SC-051-20	I WATERWAY-CALABASH CR-ST LINE	SOUTH CAROLINA	LOWER PEE DEE RIVER
370021	21	NC-019-01	I WATERWAY-CALABASH CR--0.4 MILE	NORTH CAROLINA	LOWER PEE DEE RIVER
370022	22	NC-019-02	I WATERWAY-CALABASH CR--0.9 MILE	NORTH CAROLINA	LOWER PEE DEE RIVER
370023	23	NC-019-03	I WATERWAY-CALABASH CR AT ST R	NORTH CAROLINA	LOWER PEE DEE RIVER
450825	25	SC-051-21	I WATERWAY-AT NC-SC ST LINE	SOUTH CAROLINA	LOWER PEE DEE RIVER
370026	26	NC-019-05	I WATERWAY- AT BONAPARTE LANDING	NORTH CAROLINA	LOWER PEE DEE RIVER
370027	27	NC-019-06	I WATERWAY-1.0-BONAPARTE LANDING	NORTH CAROLINA	LOWER PEE DEE RIVER
370029	29	NC-019-08	I WATERWAY-AT SUNSET BEACH BR	NORTH CAROLINA	LOWER PEE DEE RIVER
450848	30	SC-051-59	MYRTLE B-LITTLE R. INLET AT MOU.	SOUTH CAROLINA	LOWER PEE DEE RIVER
450850	31	SC-051-28	MYRTLE BCH/SWASH BTN 4TH&5TH AVE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450852	32	SC-051-29	MYRTLE BCH-MIDWAY SWASH AT HY 73	SOUTH CAROLINA	LOWER PEE DEE RIVER
450854	33	SC-051-30	MYRTLE BCH SO. HOLIDAY SO. MOTEL	SOUTH CAROLINA	LOWER PEE DEE RIVER
450856	34	SC-051-31	MYRTLE BCH AT TIKI MOTEL-25TH AV	SOUTH CAROLINA	LOWER PEE DEE RIVER
450858	35	SC-051-32	MYRTLE BCH AT END OF 15TH AVE. S	SOUTH CAROLINA	LOWER PEE DEE RIVER
450860	36	SC-051-33	MYRTLE BCH-WITHERS SWASH HWY 73	SOUTH CAROLINA	LOWER PEE DEE RIVER
450862	37	SC-051-34	MYRTLE BCH-WITHERS SW.-BROADWAY	SOUTH CAROLINA	LOWER PEE DEE RIVER
450864	38	SC-051-35	MYRTLE BCH AT 1ST ST. NORTH	SOUTH CAROLINA	LOWER PEE DEE RIVER
450866	39	SC-051-36	MYRTLE BCH AT END OF 8TH ST. NO.	SOUTH CAROLINA	LOWER PEE DEE RIVER
450868	40	SC-051-37	MYRTLE BCH BLW END OF 10TH AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450870	41	SC-051-38	MYRTLE BCH AT END OF 14TH AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450872	42	SC-051-39	MYRTLE BCH AT END OF 21ST AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450874	43	SC-051-40	MYRTLE BCH AT END OF 23RD AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450876	44	SC-051-41	MYRTLE BH AT 24TH AV N-CON PIPES	SOUTH CAROLINA	LOWER PEE DEE RIVER
450878	45	SC-051-42	MYRTLE BH AT 24TH AV N-MET SEWER	SOUTH CAROLINA	LOWER PEE DEE RIVER
450880	46	SC-051-43	MYRTLE BCH AT END OF 31ST AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450882	47	SC-051-44	MYRTLE BCH AT END OF 37TH AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450884	48	SC-051-45	MYRTLE BCH AT NED OF 38TH AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450886	49	SC-051-46	MYRTLE B-DEEP HEAD SW. AT HWY 73	SOUTH CAROLINA	LOWER PEE DEE RIVER
450888	50	SC-051-47	MYRTLE B-CANE PATCH SW. AT HY 73	SOUTH CAROLINA	LOWER PEE DEE RIVER
450890	51	SC-051-48	MYRTLE BCH/BEAR CR. AT HWY 73	SOUTH CAROLINA	LOWER PEE DEE RIVER

450892	52	SC-051-49	MYRTLE B-SINGLETON SW NR L ARRO.	SOUTH CAROLINA	LOWER PEE DEE RIVER
450894	53	SC-051-50	MYRTLE B-L ARROWHEAD CAMPGRD EFF	SOUTH CAROLINA	LOWER PEE DEE RIVER
450896	54	SC-051-51	MYRTLE B-HOLIDAY INN TRAVEL PARK	SOUTH CAROLINA	LOWER PEE DEE RIVER
450898	55	SC-051-52	MYRTLE B-SWASH AT 48TH BLVD	SOUTH CAROLINA	LOWER PEE DEE RIVER
450900	56	SC-051-53	MYRTLE B-MOG INLET CHERRY GROVE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450902	57	SC-051-54	MYRTLE BCH AT END OF 9TH AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450904	58	SC-051-55	MYRTLE BCH-BRANCH BLW 16TH AVE N	SOUTH CAROLINA	LOWER PEE DEE RIVER
450906	59	SC-051-56	MYRTLE BCH AT END OF 8TH AVE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450908	60	SC-051-57	MYRTLE B-L ARROWHEAD BATHING BCH	SOUTH CAROLINA	LOWER PEE DEE RIVER
450910	61	SC-051-58	MYRTLE B-BATHING B AT HOLIDY INN	SOUTH CAROLINA	LOWER PEE DEE RIVER
450830	OD-01	SC-051-22	MYRTLE BEACH AT OCEAN DR BH OX P	SOUTH CAROLINA	LOWER PEE DEE RIVER
450831	CB-01	SC-051-23	MYRTLE BEACH AT CRESENT BH OX P	SOUTH CAROLINA	LOWER PEE DEE RIVER
450832	LMB-01	SC-051-24	MYRTLE BEACH AT M BEACH OX P 10A	SOUTH CAROLINA	LOWER PEE DEE RIVER
450833	UMB-01	SC-051-25	MYRTLE BEACH AT M BEACH OX P NE	SOUTH CAROLINA	LOWER PEE DEE RIVER
450834	WC-01	SC-051-26	MYRTLE BEACH AT SC WELCOME CENTR	SOUTH CAROLINA	LOWER PEE DEE RIVER
450835	AFB-01	SC-051-27	MYRTLE BEACH AT M B AIR FORCE TP	SOUTH CAROLINA	LOWER PEE DEE RIVER

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
01	720414	1937	0014	3310	18.0	10.0		
01	720414	1939	0001	3310	19.0	9.0	330	130
01	720415	1223	0001	1310	20.0	14.0	330	50
01	720415	1225	0018	1310	20.0	10.0		
01	720416	1330	0001	1310	21.0	16.0	940	50
01	720416	1332	0014	1310	21.0	9.0		
01	720417	1350	0001	1310	21.0	13.0	700	20
01	720417	1352	0017	1310	21.0	12.0		
01	720418	1508	0001	1310	22.0	12.0	460	70
01	720418	1510	0016	1310	21.0	11.0		
01	720419	1132	0001	3310	21.0	10.0	330	20
01	720419	1134	0013	3310	21.0	10.0		
01	720420	1232	0001	3310	22.0	10.0	490	140
01	720420	1234	0015	3310	21.5	12.0		
01	720421	1218	0001	3310	20.5	10.0	1300	120
01	720421	1220	0015	3310	20.5	12.0		
01	720822	1615	0019	3310	27.5	8.0	490	20
01	720823	1550		3310	28.0	8.0	1300	50
01	720823	1552	0019	3310	28.0	8.0		
01	720824	1645		3310	28.0	11.0	170	50
01	720824	1646	0018	3310	28.0	9.0		
01	720825	1700		3310	27.5	8.0	300	80
01	720825	1701	0019	3310	27.0	9.0		
01	720826	1252		1310	27.0	13.0	1100	70
01	720826	1253	0023	1310	27.0	17.0		
01	720827	1303		1310	28.0	9.0	490	80
01	720827	1304	0020	1310	28.0	8.0		
01	720829	1449		1310	27.5	8.0	1100	110
01	720829	1450	0020	1310	27.5	8.0		
02	720414	1920	0001	3310	18.0	10.0	170	110
02	720415	1225	0001	1310	20.0	10.0	1300	50
02	720416	1320	0001	1310	21.5	10.0	1100	140
02	720417	1339	0001	1310	22.0	12.0	3300	80
02	720418	1502	0001	1310	23.0	17.0	330	20
02	720419	1119	0001	3310	22.0	8.0	230	50
02	720420	1220	0001	3310	22.0	10.0	110	20
02	720421	1210	0001	3310	20.5	10.0	790	20
02	720822	1605		3310	27.5	7.0	940	20
02	720823	1540		3310	28.0	7.0	790	20
02	720824	1636		3310	28.0	8.0	790	20
02	720825	1650		3310	27.5	12.0	3300	60
02	720826	1240		1310	28.5	10.0	3300	80
02	720827	1252		1310	29.5	9.0	790	50
02	720829	1438		1310	29.0	9.0	140	40

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALAMASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
03	720414	1853	0001	3310	18.0	10.0	330	20
03	720415	1213	0001	1310	20.0	9.0	330	170
03	720416	1300	0001	1310	21.5	9.0	330	110
03	720417	1336	0001	1310	21.5	11.0	490	80
03	720418	1455	0001	1310	21.5	10.0	330	70
03	720419	1112	0001	3310	22.0	9.0	330	50
03	720420	1213	0001	3310	23.0	13.0	220	70
03	720421	1203	0001	3310	20.5	10.0	70	50
03	720822	1553		3310	28.0	8.0	1700	70
03	720823	1525		3310	26.0	4.0	2300	50
03	720824	1621		3310	28.5	14.0	1300	50
03	720825	1638		3310	27.5	8.0	330	50
03	720826	1224		1310	29.0	10.0	35000	270
03	720827	1231		1310	29.0	6.0	2200	490
03	720828	1342		1310	30.0	8.0	790	130
03	720829	1424		1310	29.0	9.0	2200	20
04	720414	1850	0001	3310	18.0	12.0	1300	490
04	720415	1210	0001	1310	20.5	11.0	490	80
04	720416	1305	0001	1310	21.0	10.0	230	80
04	720417	1327	0001	1310	22.0	10.0	940	110
04	720418	1452	0001	1310	21.5	10.0	230	50
04	720419	1105	0001	3310	21.5	9.0	170	20K
04	720420	1209	0001	3310	22.5	11.0	220	40
04	720421	1158	0001	3310	20.5	11.0	490	20
04	720822	1550		3310	28.0	8.0	1100	50
04	720823	1520		3310	29.0	8.0	1100	80
04	720824	1618		3310	29.0	9.0	490	330
04	720825	1634		3310	28.0	8.0	490	50
04	720826	1220		1310	28.5	10.0	35000	1100
04	720827	1228		1310	28.5	12.0	1700	490
04	720828	1339		1310	29.5	9.0	2800	330
04	720829	1420		1310	29.0	8.0	1300	220

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CARULINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
05	720414	1843	0001	3310	19.0	9.0	330	50
05	720414	1845	0014	3310	18.0	10.0		
05	720415	1202	0001	1310	20.0	12.0	7900	490
05	720415	1204	0015	1310	20.0	11.0		
05	720416	1241	0001	1310	21.5	10.0	1100	330
05	720416	1243	0015	1310	21.5	9.0		
05	720417	1320	0001	1310	22.0	12.0	2300	2300
05	720417	1322	0014	1310	21.0	10.0		
05	720418	1444	0001	1310	22.0	15.0	2300	790
05	720418	1446	0015	1310	21.5	10.0		
05	720419	1054	0001	3310	21.5	10.0	230	50
05	720419	1056	0013	3310	21.5	16.0		
05	720420	1202	0001	3310	22.5	12.0	260	50
05	720420	1204	0013	3310	22.0	11.0		
05	720421	1150	0001	3310	20.0	12.0	330	50
05	720421	1152	0012	3310	20.0	10.0		
05	720822	1540		3310	28.5	8.0	1300	130
05	720822	1542	0016	3310	28.5	8.0		
05	720823	1515		3310	28.5	9.0	4900	170
05	720823	1517	0015	3310	28.5	9.0		
05	720824	1611		3310	29.0	8.0	7900	460
05	720824	1612	0017	3310	29.0	9.0		
05	720825	1628		3310	28.5	9.0	2300	490
05	720825	1629	0015	3310	28.0	9.0		
05	720826	1214		1310	29.5	10.0	240000L	1700
05	720826	1215	0019	1310	28.5	13.0		
05	720827	1221		1310	29.0	11.0	170000	4900
05	720827	1222	0018	1310	28.5	10.0		
05	720828	1334		1310	29.5	10.0	920000	79000
05	720828	1335	0029	1310	29.0	13.0		
05	720829	1413		1310	29.5	9.0	70000	2300
05	720829	1414	0019	1310	29.0	12.0		
06	720414	1838	0001	3310	19.0	10.0	11000	1300
06	720415	1158	0001	1310	20.0	10.0	4900	1100
06	720416	1235	0001	1310	21.0	10.0	2300	490
06	720417	1315	0001	1310	22.0	11.0	3300	2300
06	720418	1436	0001	1310	23.0	10.0	4900	1300
06	720419	1051	0001	3310	22.0	11.0	230	130
06	720420	1157	0001	3310	22.5	10.0	630	70
06	720421	1142	0001	3310	20.0	11.0	3300	1300
06	720822	1530		3310	29.0	9.0	31000	4900
06	720823	1505		3310	29.0	9.0	33000	4600
06	720824	1602		3310	29.0	10.0	11000	4900
06	720825	1622		3310	28.5	10.0	7900	2300
06	720826	1208		1310	29.5	12.0	160000	2300

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
06	720827	1215		1310	29.5	11.0	350000	3300
06	720828	1328		1310	29.5	12.0	220000	3100
06	720829	1409		1310	29.5	11.0	350000	3200
07	720414	1825	0001	3310	19.0	9.0	3300	490
07	720415	1150	0001	1310	19.5	11.0	1300	1300
07	720416	1222	0001	1310	21.0	11.0	13000	1700
07	720417	1308	0001	1310	22.0	11.0	7900	4900
07	720418	1427	0001	1310	22.5	11.0	4600	490
07	720419	1042	0001	3310	22.0	150.0	4900	1700
07	720420	1149	0001	3310	22.5	11.0	4900	700
07	720421	1135	0001	3310	20.0	11.0	4900	490
07	720822	1525		3310	29.0	9.0	4900	2300
07	720823	1455		3310	29.5	11.0	35000	3300
07	720824	1554		3310	29.5	10.0	3300	1700
07	720825	1614		3310	29.5	12.0	160000	3300
07	720826	1202		1310	29.0	18.0	92000	790
07	720827	1209		1310	28.5	11.0	1600000	1300
07	720828	1321		1310	30.0	11.0	170000	1300
07	720829	1402		1310	29.5	12.0	28000	200
08	720414	1810	0001	3310	19.5	10.0	7000	1700
08	720415	1145	0001	1310	20.0	13.0	1100	790
08	720416	1213	0001	1310	21.0	11.0	3300	790
08	720417	1303	0001	1310	22.0	12.0	3300	330
08	720418	1422	0001	1310	22.5	10.0	4900	310
08	720419	1036	0001	3310	22.0	11.0	14000	1300
08	720420	1142	0001	3310	22.5	10.0	3100	1300
08	720421	1129	0001	3310	20.0	10.0	4900	170
08	720822	1520		3310	28.5	10.0	4900	1700
08	720823	1450		3310	29.0	10.0	11000	2300
08	720824	1550		3310	29.5	10.0	22000	1300
08	720825	1609		3310	29.5	12.0	54000	790
08	720826	1156		1310	29.5	14.0	14000	630
08	720827	1204		1310	29.0	12.0	92000	1100
08	720828	1316		1310	29.5	11.0	28000	170
08	720829	1358		1310	29.0	12.0	43000	110

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
09	720414	1012	0001	3310	19.5	37.0	11000	460
09	720415	1138	0001	1310	20.0	11.0	4900	2200
09	720416	1205	0001	1310	21.0	12.0	1100	330
09	720417	1257	0001	1310	22.0	12.0	1300	230
09	720418	1415	0001	1310	22.0	10.0	7000	460
09	720419	1031	0001	3310	22.0	11.0	4900	330
09	720420	1117	0001	3310	22.5	10.0	3300	330
09	720421	1118	0001	3310	20.0	10.0	3300	330
09	720822	1515		3310	28.0	11.0	13000	1700
09	720823	1445		3310	29.0	11.0	14000	490
09	720824	1545		3310	29.5	10.0	2400001	1300
09	720825	1604		3310	29.5	11.0	17000	330
09	720826	1150		1310	29.0	20.0	7900	170
09	720827	1159		1310	28.5	10.0	1000	40
09	720828	1311		1310	29.5	11.0	2200	110
09	720829	1350		1310	29.0	12.0	2600	330
10	720414	1803	0001	3310	19.5	11.0	11000	1400
10	720415	1132	0001	1310	20.0	11.0	2300	330
10	720416	1155	0001	1310	21.0	11.0	430	230
10	720417	1245	0001	1310	22.0	11.0	1400	330
10	720418	1405	0001	1310	22.0	12.0	1300	330
10	720419	1022	0001	3310	22.0	11.0	1100	330
10	720420	1113	0001	3310	22.0	11.0	7900	1300
10	720421	1112	0001	3310	21.0	11.0	2300	130
10	720822	1505		3310	29.0	11.0	13000	790
10	720822	1506	0014	3310	29.0	12.0		
10	720823	1135		3310	29.0	11.0	13000	790
10	720823	1437	0013	3310	29.0	11.0		
10	720824	1538		3310	29.5	11.0	35000	330
10	720824	1539	0014	3310	29.5	11.0		
10	720825	1556		3310	29.5	13.0	3300	330
10	720825	1557	0015	3310	29.0	11.0		
10	720826	1142		1310	29.0	14.0	2300	170
10	720826	1143	0016	1310	28.5	23.0		
10	720827	1153		1310	29.5	12.0	1700	330
10	720827	1154	0019	1310	29.5	13.0		
10	720828	1305		1310	29.5	13.0	790	170
10	720828	1306	0017	1310	29.0	14.0		
10	720829	1343		1310	29.0	12.0	2100	490
10	720829	1344	0014	1310	29.0	13.0		

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
11	720414	1800	0001	3310	19.0	11.0	4900	490
11	720415	1127	0001	1310	20.5	24.0	790	330
11	720416	1145	0001	1310	21.0	11.0	2300	330
11	720417	1238	0001	1310	22.0	21.0	1100	90
11	720418	1400	0001	1310	22.5	10.0	1300	130
11	720419	1017	0001	3310	22.0	11.0	7900	170
11	720420	1108	0001	3310	23.0	10.0	1300	1300
11	720421	1108	0001	3310	20.5	13.0	3300	230
11	720822	1500		3310	29.0	10.0	4900	490
11	720822	1501	0013	3310	28.5	11.0		
11	720823	1425		3310	29.0	13.0	2300	330
11	720823	1427	0016	3310	29.0	13.0		
11	720824	1521		3310	29.5	11.0	2200	230
11	720824	1522	0013	3310	29.5	12.0		
11	720825	1551		3310	29.5	11.0	11000	210
11	720825	1552	0015	3310	29.5	12.0		
11	720826	1129		1310	29.0	42.0	14000	490
11	720826	1130	0010	1310	29.0	25.0		
11	720827	1147		1310	29.5	25.0	1300	790
11	720827	1148	0019	1310	28.5	23.0		
11	720828	1259		1310	29.0	26.0	1300	790
11	720828	1300	0017	1310	29.0	29.0		
11	720829	1336		1310	29.0	25.0	7000	330
11	720829	1337	0016	1310	28.5	25.0		
12	720414	1730	0001	3310	19.0	10.0	7900	1700
12	720415	1123	0001	1310	20.0	11.0	790	220
12	720416	1140	0001	1310	21.0	11.0	790	330
12	720417	1235	0001	1310	22.0	15.0	1300	2300
12	720418	1352	0001	1310	22.5	10.0		140
12	720419	1000	0001	3310	22.0	13.0	1300	490
12	720420	1105	0001	3310	23.0	13.0	1100	230
12	720421	1106	0001	3310	20.5	15.0	4900	230
12	720822	1455		3310	29.0	11.0	7000	1700
12	720822	1456	0015	3310	29.0	12.0		
12	720823	1430		3310	29.5	10.0	7000	700
12	720823	1432	0016	3310	29.5	13.0		
12	720824	1517		3310	29.5	10.0	17000	330
12	720824	1518	0014	3310	29.5	12.0		
12	720825	1547		3310	29.5	12.0	7000	170
12	720825	1548	0015	3310	29.5	13.0		
12	720826	1124		1310	29.5	50.0	2200	330
12	720826	1125	0020	1310	29.0	49.0		
12	720827	1144		1310	28.5	45.0	1700	1100
12	720827	1145	0021	1310	28.5	44.0		
12	720828	1256		1310	29.5	73.0	790	220

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
12	720828	1257	0020	1310	29.5	65.0		
12	720829	1334		1310	29.0	41.0	4600	490
12	720829	1335	0020	1310	29.0	41.0		
13	720414	1720	0001	3310	19.0	10.0	3300	1700
13	720414	1722	0015	3310	19.0	21.0		
13	720415	1115	0001	1310	19.5	24.0	1300	330
13	720415	1117	0015	1310	19.5	27.0		
13	720416	1126	0001	1310	20.5	24.0	330	70
13	720416	1128	0015	1310	21.0	24.0		
13	720417	1215	0001	1310	21.5	22.0	220	50
13	720417	1217	0014	1310	21.5	26.0		
13	720418	1342	0001	1310	22.0	23.0	700	170
13	720418	1344	0014	1310	21.5	25.0		
13	720419	0940	0001	3310	21.0	12.0	2300	170
13	720419	0942	0013	3310	21.0	16.0		
13	720420	1036	0001	3310	22.5	11.0	1100	490
13	720420	1038	0013	3310	22.5	12.0		
13	720421	1055	0001	3310	20.0	11.0	2200	130
13	720421	1057	0014	3310	20.0	10.0		
13	720822	1450		3310	28.5	11.0	2200	230
13	720822	1451	0014	3310	29.0	14.0		
13	720823	1410		3310	29.0	15.0	7900	490
13	720823	1412	0014	3310	29.0	15.0		
13	720824	1508		3310	29.5	14.0	3300	790
13	720824	1509	0013	3310	29.5	22.0		
13	720825	1527	0017	3310	29.5	23.0		
13	720825	1536		3310	29.5	22.0	22000	1200
13	720826	1106		1310	29.0	1150.0	22000	790
13	720826	1107	0019	1310	29.0	1300.0		
13	720827	1136		1310	29.0	1900.0	1400	490
13	720827	1137	0020	1310	29.0	2150.0		
13	720828	1247		1310	29.5	2200.0	1300	330
13	720828	1248	0020	1310	29.5	2500.0		
13	720829	1325		1310	28.5	1050.0	4900	230
13	720829	1326	0019	1310	28.0	1200.0		

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
14	720414	1709	0001	3310	19.6	12.0	4900	790
14	720415	1107	0001	1310	19.5	50.0	1400	230
14	720416	1116	0001	1310	21.0	50.0	790	330
14	720417	1212	0001	1310	21.5	54.0	330	110
14	720418	1328	0001	1316	23.0	46.0	790	70
14	720419	0945	0001	3310	21.0	11.0	1100	230
14	720420	1030	0001	3310	22.0	10.0	2300	170
14	720421	1052	0001	3310	20.5	12.0	4900	230
14	720822	1445		3316	29.0	17.0	13000	110
14	720822	1446	0013	3310	29.0	28.0		
14	720823	1405		3310	29.0	13.0	2100	790
14	720823	1407	0013	3310	29.0	14.0		
14	720824	1504		3310	29.5	14.0	7900	790
14	720824	1505	0013	3310	29.5	16.0		
14	720825	1531		3310	29.5	84.0	54000	310
14	720825	1532	0014	3310	29.5	88.0		
14	720826	1100		1310	29.6	3650.0	1100	700
14	720826	1101	0018	1310	28.5	4800.0		
14	720827	1132		1315	29.5	4700.0	13000	110
14	720827	1133	0021	1310	29.5	6150.0		
14	720828	1240		1310	29.5	4800.0	1300	790
14	720828	1241	0020	1310	29.0	6300.0		
14	720829	1319		1310	29.5	3950.0	2200	700
14	720829	1320	0017	1310	29.5	5100.0		
15	720414	1611	0001	3310	19.0	11.0	2200	460
15	720415	1056	0001	1310	20.0	315.0	1700	170
15	720416	1106	0001	1310	21.0	200.0	1100	130
15	720417	1150	0001	1310	21.5	230.0	490	110
15	720418	1304	0001	1310	23.0	120.0	790	110
15	720419	0840	0001	3310	20.5	22.0	1300	220
15	720420	1002	0001	3310	22.0	12.0	1700	490
15	720421	1043	0001	3310	21.0	17.0	1700	130
15	720822	1410		3310	29.0	20.0	24000	790
15	720822	1411	0010	3310	29.5	29.0		
15	720823	1345		3310	29.5	74.0	4600	700
15	720823	1347	0010	3310	29.5	80.0		
15	720824	1438		3310	29.5	98.0	7900	790
15	720824	1439	0010	3310	29.5	98.0		
15	720825	1502		3310	29.5	1600.0	7900	330
15	720825	1503	0010	3310	29.5	1650.0		
15	720826	1036		1310	29.0	6900.0	1500	230
15	720826	1037	0023	1310	28.0	12400.0		
15	720827	1120		1310	29.0	9300.0	2000	140
15	720827	1121	0024	1310	28.5	14600.0		
15	720829	1226		1310	29.5	9300.0	940	210

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LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
15	720828	1227	0021	1310	28.5	14400.0		
15	720829	1309		1310	29.0	9100.0	1100	80
15	720829	1310	0021	1310	28.5	14400.0		
16	720414	1603	0001	3310	19.0	10.0	790	790
16	720415	1050	0001	1310	21.0	400.0	330	230
16	720416	1054	0001	1310	21.0	5700.0	460	50
16	720417	1142	0001	1310	21.5	5500.0	490	70
16	720418	1255	0001	1310	23.0	3000.0	4300	50
16	720419	0808	0001	3310	21.0	13.0	490	130
16	720420	0903	0001	3310	22.0	70.0	4900	70
16	720421	0956	0001	3310	21.0	80.0	1300	330
16	720822	1420		3310	29.0	1000.0	1700	490
16	720822	1421	0015	3310	29.0	4600.0		
16	720823	1335		3310	29.0	3900.0	4900	330
16	720823	1337	0015	3310	29.5	5300.0		
16	720824	1430		3310	30.0	4400.0	7900	270
16	720824	1431	0016	3310	29.5	6100.0		
16	720825	1450		3310	29.0	9250.0	3300	130
16	720825	1451	0016	3310	29.0	10000.0		
16	720826	1026		1310	28.0	17300.0	170	20
16	720826	1027	0020	1310	28.0	18700.0		
16	720827	1102		1310	28.0	18000.0	20	20K
16	720827	1103	0021	1310	28.0	19100.0		
16	720828	1217		1310	28.5	19100.0	20	20K
16	720828	1218	0019	1310	28.0	19700.0		
16	720829	1300		1310	29.0	16000.0	330	50
16	720829	1301	0019	1310	28.0	19700.0		
17	720414	1515	0001	3310	20.0	5000.0	1700	170
17	720415	1012	0001	1310	17.5	15200.0	220	70
17	720416	1023	0001	1310	19.0	15500.0	80	50
17	720417	1120	0001	1310	20.5	13200.0	130	50
17	720418	1224	0001	1310	21.5	12500.0	330	40
17	720419	0734	0001	3310	19.5	7000.0	490	20
17	720420	0834	0001	3310	21.0	6000.0	170	80
17	720421	0925	0001	3310	20.0	5500.0	320	20
17	720822	1340		3310	29.0	9450.0	1300	490
17	720822	1342	0007	3310	28.0	13300.0		
17	720823	1305		3310	29.5	12500.0	170	20
17	720823	1307	0005	3310	29.0	12000.0		
17	720824	1410		3310	30.0	12200.0	490	80
17	720824	1411	0004	3310	30.0	12600.0		
17	720825	1432		3310	30.0	13300.0	790	50
17	720825	1433	0007	3310	30.0	13300.0		

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
17	720826	1000		1310	27.5	17100.0	220	20K
17	720826	1001	0010	1310	27.5	19100.0		
17	720827	1041		1310	28.0	18700.0	20K	20K
17	720827	1042	0012	1310	28.0	19400.0		
17	720828	1156		1310	28.5	19100.0	20K	20K
17	720828	1157	0007	1310	28.5	19500.0		
17	720829	1230		1310	28.0	19700.0	20	20
17	720829	1231	0007	1310	28.0	19700.0		
18	720414	1507	0001	3310	19.0		2200	210
18	720414	1509	0011	3310	19.0	15000.0		
18	720415	1007	0001	1310	17.0	17500.0	130	50
18	720415	1010	0016	1310	15.5	17500.0		
18	720416	0952	0014	1310	17.5	17500.0		
18	720416	0956	0001	1310	16.0	17500.0	20	20K
18	720417	1050	0001	1310	18.5	17000.0	50	20K
18	720417	1052	0016	1310	17.5	17500.0		
18	720418	1206	0001	1310	20.0	16700.0	20K	20K
18	720418	1208	0014	1310	19.0	17500.0		
18	720419	0702	0001	3310	19.5	7600.0	230	130
18	720419	0704	0012	3310	19.5	16000.0		
18	720420	0808	0001	3310	21.0	5500.0	460	60
18	720420	0810	0012	3310	21.0	15000.0		
18	720421	0902	0001	3310	20.5	5500.0	790	80
18	720421	0904	0014	3310	20.0	13000.0		
18	720822	1330		3310	28.5	8350.0	1700	310
18	720822	1331	0014	3310	28.0	17700.0		
18	720823	1300		3310	28.5	17000.0	130	40
18	720823	1302	0013	3310	28.5	17300.0		
18	720824	1405		3310	29.5	17600.0	50	20K
18	720824	1406	0016	3310	29.5	18600.0		
18	720825	1428		3310	29.5	17600.0	220	20K
18	720825	1429	0013	3310	29.5	18300.0		
18	720826	0954		1310	27.5	19800.0	50	20K
18	720826	0955	0014	1310	27.5	19100.0		
18	720827	1038		1310	28.0	19200.0	20K	20K
18	720827	1039	0019	1310	28.0	19600.0		
18	720828	1153		1310	28.5	19600.0	20	20
18	720828	1154	0019	1310	29.0	19600.0		
18	720829	1224		1310	28.0	19600.0	50	20K
18	720829	1225	0020	1310	27.5	19600.0		

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SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
19	720414	1410	0001	3310	19.0	7200.0	490	130
19	720415	0925	0001	1310	15.0	17600.0	50	20K
19	720416	0950	0001	1310	17.5	17500.0	20K	20K
19	720417	1045	0001	1310	18.0	17500.0	20	20
19	720418	1203	0001	1310	19.0	17500.0	20K	20K
19	720419	0635	0001	3310	19.5	10000.0	170	50
19	720420	0805	0001	3310	21.0	7600.0	1300	60
19	720421	0855	0001	3310	21.0	7000.0	330	50
19	720822	1255		3310	28.0	10000.0	130	230
19	720822	1256	0019	3310	28.0	15100.0		
19	720823	1225		3310	28.5	12800.0	300	60
19	720823	1227	0013	3310	28.5	16000.0		
19	720824	1335		3310	29.5	13200.0	1600	50
19	720824	1336	0018	3310	29.0	16200.0		
19	720825	1400		3310	29.5	16600.0	1700	20K
19	720825	1401	0019	3310	29.5	16700.0		
19	720826	0907		1310	27.5	19700.0	20K	20K
19	720826	0908	0014	1310	27.0	19700.0		
19	720827	1010		1310	28.0	19100.0	20K	20K
19	720827	1011	0019	1310	28.0	19200.0		
19	720828	1122		1310	28.5	19800.0	20K	20K
19	720828	1123	0021	1310	28.5	19800.0		
19	720829	1150		1310	28.0	19800.0	20	20K
19	720829	1151	0026	1310	28.0	19800.0		
20	720415	1040	0001	1310	20.0	13200.0	790	80
20	720416	1045	0001	1310	22.5	10800.0	230	50
20	720417	1126	0001	1310	21.5	12500.0	80	50
20	720418	1248	0001	1310	22.5	10700.0	3300	50
20	720419	0754	0001	3310	18.0	4000.0	4900	330
20	720420	0852	0001	3310	21.0	3200.0	700	130
20	720421	0946	0001	3310	19.0	3000.0	1400	310
21	720414	1518	0001	3310	22.0	8200.0	490	80
21	720415	1017	0001	1310	16.5	13700.0	170	20K
21	720416	1027	0001	1310	20.0	13700.0	140	20K
21	720417	1123	0001	1310	20.5	12500.0	330	50
21	720418	1237	0001	1310	21.0	12500.0	2300	20
21	720419	0736	0001	3310	19.5	8200.0	220	40
21	720420	0842	0001	3310	21.0	9000.0	1300	80
21	720421	0938	0001	3310	20.0	5000.0	340	50
21	720822	1345		3310	29.5	12200.0	220	20K
21	720822	1346	0007	3310	26.0	12600.0		
21	720823	1310		3310	29.5	12000.0	490	130
21	720823	1312	0006	3310	29.5	12200.0		

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LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
21	720824	1412		3310	30.5	11800.0	330	40
21	720824	1413	0003	3310	30.5	11700.0		
21	720825	1435		3310	29.5	12400.0	790	50
21	720825	1436	0006	3310	29.5	13100.0		
21	720826	1004		1310	27.5	16600.0	1100	50
21	720826	1005	0011	1310	27.5	18900.0		
21	720827	1045		1310	28.0	19500.0	20	20K
21	720827	1046	0011	1310	28.0	19400.0		
21	720828	1200		1310	28.5	18500.0	50	50
21	720828	1201	0010	1310	28.5	19400.0		
21	720829	1232		1310	28.0	20000.0	20	20
21	720829	1233	0011	1310	27.5	19400.0		
22	720414	1523	0001	3310	22.5	6700.0	1100	170
22	720415	1020	0001	1310	19.0	11200.0	700	110
22	720416	1032	0001	1310	21.0	11200.0	220	70
22	720417	1126	0001	1310	21.0	10500.0	460	20K
22	720418	1240	0001	1310	22.0	11200.0	2300	40
22	720419	0742	0001	3310	19.0	9200.0	790	80
22	720420	0828	0001	3310	21.0	7700.0	230	20
22	720421	0940	0001	3310	20.0	5500.0	490	90
22	720822	1350		3310	30.0	11100.0	170	80
22	720822	1351	0003	3310	29.0	11200.0		
22	720823	1315		3310	29.5	11000.0	490	80
22	720823	1317	0004	3310	30.0	11200.0		
22	720824	1415		3310	31.5	11000.0	80	20
22	720824	1416	0004	3310	31.0	11000.0		
22	720825	1438		3310	30.0	11300.0	790	20
22	720825	1439	0003	3310	30.0	11200.0		
22	720826	1009		1310	27.0	14700.0	330	50
22	720826	1010	0009	1310	27.0	18100.0		
22	720827	1048		1310	28.0	17900.0	70	20K
22	720827	1049	0011	1310	28.0	19000.0		
22	720828	1203		1310	29.0	17500.0	330	20K
22	720828	1204	0008	1310	28.0	18900.0		
22	720829	1236	0007	1310	28.0	19300.0		
22	720829	1253		1310	28.5	17500.0	50	20K

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LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
23	720414	1538	0001	3310	24.0	350.0	1100	460
23	720415	1023	0001	1310	19.5	9700.0	790	140
23	720416	1035	0001	1310	21.5	9200.0	330	130
23	720417	1130	0001	1310	22.0	8200.0	330	130
23	720418	1243	0001	1310	23.0	9500.0	790	20K
23	720419	0638	0001	3310			7900	230
23	720420	0750	0001	3310		4000.0	1100	230
23	720421	0850	0001	3310		3600.0	330	40
23	720822	1225		3310			1300	110
23	720822	1226	0002	3310		8700.0		
23	720823	1254		3310	31.0	9100.0	490	50
23	720823	1255	0002	3310	31.0	9200.0		
23	720824	1331		3310	31.0	9300.0	490	40
23	720824	1334	0002	3310	31.0	9400.0		
23	720825	1439		3310		8100.0	4900	490
23	720825	1441	0002	3310		8500.0		
23	720826	1013		1310	27.5	13400.0	310	170
23	720826	1014	0008	1310	27.5	15100.0		
23	720827	1051		1310	28.5	15400.0	460	50
23	720827	1052	0010	1310	28.5	17000.0		
23	720828	1206		1310	29.0	15000.0	230	20K
23	720828	1207	0008	1310	29.0	16600.0		
23	720829	1240		1310	29.0	14800.0	170	80
23	720829	1241	0006	1310	28.0	16900.0		
25	720414	1505	0001	3310	18.5	15700.0	50	20K
25	720415	0934	0001	1310	18.0	16700.0	130	20
25	720416	1000	0001	1310	18.0	17000.0	130	20K
25	720417	1055	0001	1310	20.0	13200.0	490	130
25	720418	1210	0001	1310	20.5	14200.0	170	20
25	720419	0707	0001	3310	19.0	15000.0	20	20K
25	720420	0814	0001	3310	20.5	14200.0	210	20K
25	720421	0908	0001	3310	19.0	12500.0	50	20K
25	720822	1325		3310	28.5	17800.0	60	20K
25	720822	1326	0013	3310	28.0	18600.0		
25	720823	1255		3310	28.0	17600.0	80	50
25	720823	1257	0006	3310	28.0	17900.0		
25	720824	1403		3310	29.5	18400.0	20	20
25	720824	1404	0011	3310	29.5	18900.0		
25	720825	1424		3310	30.0	18000.0	80	20K
25	720825	1425	0014	3310	30.0	18900.0		
25	720826	0950		1310	27.5	18900.0	20	20K
25	720826	0951	0015	1310	27.5	19000.0		
25	720827	1034		1310	28.0	19300.0	20	20
25	720827	1035	0019	1310	27.5	19400.0		
25	720828	1150		1310	28.0	19400.0	20	20K

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECHED /100ML
25	720828	1151	0015	1310	28.0	19400.0		
25	720829	1220		1310	28.5	18800.0	20	20K
25	720829	1221	0018	1310	28.0	19600.0		
26	720414	1458	0001	3310	19.0	16500.0	330	20K
26	720415	0938	0001	1310	18.0	13700.0	790	20
26	720416	1003	0001	1310	19.5	12700.0	230	20
26	720417	1100	0001	1310	20.0	12500.0	330	70
26	720418	1214	0001	1310	21.0	12500.0	2300	20
26	720419	0711	0001	3310	19.0	17500.0	50	20
26	720420	0817	0001	3310	20.5	15000.0	330	20K
26	720421	0912	0001	3310	20.0	13700.0	20	20K
26	720822	1320		3310	28.0	18900.0	80	20K
26	720822	1321	0014	3310	28.0	18900.0		
26	720823	1250		3310	28.0	18900.0	80	20K
26	720823	1252	0014	3310	28.0	18800.0		
26	720824	1400		3310	29.5	18900.0	50	20
26	720824	1402	0016	3310	29.5	19400.0		
26	720825	1420		3310	29.5	19300.0	20K	20K
26	720825	1421	0015	3310	29.5	19400.0		
26	720826	0942		1310	27.5	17300.0	140	20K
26	720826	0943	0014	1310	27.5	18400.0		
26	720827	1029		1310	28.0	18800.0	50	20K
26	720827	1030	0019	1310	28.0	18900.0		
26	720828	1145		1310	28.5	18500.0	110	50
26	720828	1146	0019	1310	28.0	18700.0		
26	720829	1213		1310	28.0	18400.0	50	20
26	720829	1214	0020	1310	28.0	19200.0		
27	720414	1455	0001	3310	19.0	16500.0	50	20
27	720415	0943	0001	1310	17.5	13500.0	13000	20
27	720416	1005	0001	1310	19.5	12700.0	490	20
27	720417	1103	0001	1310	20.5	12500.0	80	50
27	720418	1217	0001	1310	20.5	13000.0	7900	20K
27	720419	0714	0001	3310	18.5	17500.0	80	20K
27	720420	0820	0001	3310	20.5	15000.0	80	50
27	720421	0916	0001	3310	19.5	15000.0	50	20
27	720822	1315		3310	28.0	18800.0	40	20
27	720822	1316	0014	3310	27.5	19500.0		
27	720823	1245		3310	28.0	18700.0	40	20K
27	720823	1247	0012	3310	28.5	19300.0		
27	720824	1355		3310	29.5	18700.0	20K	20K
27	720824	1357	0012	3310	29.5	19500.0		
27	720825	1416		3310	29.5	19200.0	20	20
27	720825	1417	0016	3310	29.5	19200.0		

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SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECHED /100ML
30	720822	1245		3310	28.0	13500.0	330	70
30	720822	1246	0006	3310	26.0	14300.0		
30	720823	1215		3310	28.5	15900.0	490	50
30	720823	1217	0006	3310	28.0	15900.0		
30	720824	1330		3310	29.0	16000.0	2300	130
30	720824	1332	0005	3310	29.0	15700.0		
30	720825	1355		3310	29.5	17100.0	310	80
30	720825	1356	0005	3310	29.5	17000.0		
30	720826	0837	0011	1310	27.5	19300.0		
30	720826	0855		1310	27.5	19560.0	50	20K
30	720827	1000		1316	28.5	18900.0	50	20K
30	720827	1001	0014	1310	28.5	19300.0		
30	720828	1118		1310	28.5	19500.0	20K	20K
30	720828	1119	0013	1316	28.5	19500.0		
30	720829	1145		1316	28.5	19500.0	20K	20K
30	720829	1147	0012	1310	28.5	19600.0		
31	720830	0545		3310			1300	80
31	720831	0620		3310			2200	330
31	720901	0635		3310			4900	700
31	720902	1030		3310			790	330
31	720903	0740		3310			700	170
32	720830	0555		3310			2200	20
32	720831	0638		3310			2800	80
32	720901	0645		3310			240000L	3300
32	720902	1020		3310			7900	500
32	720903	0745		3310			3300	490
33	720901	0647		3310			22000	7000
33	720902	1010		3310			20K	20K

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
34	720830	0605		3310			3300	130
34	720831	0640		3310			13000	330
34	720901	0650		3310			35000	2300
34	720902	1015		3310			13000	3300
34	720903	0750		3310			7900	49
35	720830	0615		3310			460	80
35	720831	0643		3310			230	130
35	720901	0655		3310			2300	1300
35	720902	1005		3310			170	20
35	720903	0755		3310			20	20
36	720830	0620		3310			13000	3300
36	720831	0650		3310			11000	7900
36	720901	0657		3310			35000	35000
36	720902	1000		3310			7000	2300
36	720903	0800		3310			4900	2300
37	720830	0630		3310			92000	13000
37	720831	0655		3310			79000	11000
37	720901	0705		3310			33000	23000
37	720902	0955		3310			240000	49000
37	720903	0805		3310			220000	49000
38	720830	0635		3310			110	20
38	720831	0700		3310			50	20K
38	720901	0710		3310			790	50
38	720902	0950		3310			490	70
38	720903	0810		3310			20	20K
39	720830	0645		3310			92000	4600
39	720831	0705		3310			22000	500
39	720901	0715		3310			2400000L	170000
39	720902	0935		3310			350000	79000
39	720903	0815		3310			31000	7900

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
40	720830	0655		3310			4900	80
40	720831	0712		3310			1700	20
40	720901	0725		3310			160000	35000
40	720902	0930		3310			2200	330
40	720903	0830		3310			4900	1300
41	720830	0700		3310			4900	1300
41	720831	0715		3310			7000	310
41	720901	0728		3310			160000	17000
41	720902	0930		3310			23000	1100
41	720903	0835		3310			2200	330
42	720830	0700		3310			2800	130
42	720831	0720		3310			3300	50
42	720901	0735		3310			92000	7000
42	720902	0920		3310			80	20K
42	720903	0840		3310			80	20K
43	720830	0705		3310			50	20
43	720831	0725		3310			20	20K
43	720901	0740		3310			1100	110
43	720902	0915		3310			70	20
43	720903	0840		3310			20K	20K
44	720830	0715		3310			35000	4900
44	720831	0725		3310			110000	1700
44	720901	0745		3310			130000	79000
44	720902	0910		3310			23000	4900
44	720903	0845		3310			11000	2300
45	720830	0715		3310			35000	7900
45	720831	0725		3310			17000	1100
45	720901	0745		3310			160000	24000
45	720902	0910		3310			350000	130000
45	720903	0845		3310			49000	13000

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
46	720830	0720		3310			2200	20
46	720831	0730		3310			4900	50
46	720901	0748		3310			54000	7000
46	720902	0905		3310			2800	210
46	720903	0850		3310			1700	140
47	720830	0725		3310			17000	490
47	720831	0735		3310			13000	230
47	720901	0750		3310			54000	4900
47	720902	0900		3310			17000	500
47	720903	0855		3310			7900	2200
48	720830	0730		3310			50	20
48	720831	0740		3310			220	20
48	720901	0755		3310			330	70
48	720902	0900		3310			20K	20K
48	720903	0855		3310			20K	20K
49	720830	0735		3310			54000	35000
49	720831	0745		3310			130000	17000
49	720901	0800		3310			3300	3300
49	720902	0850		3310			3300	500
49	720903	0900		3310			1300	1300
50	720830	0745		3310			54000	790
50	720831	0750		3310			33000	800
50	720901	0805		3310			130000	17000
50	720902	0845		3310			16000	1400
50	720903	0905		3310			49000	2300
51	720830	0755		3310			13000	170
51	720831	0755		3310			2300	170
51	720901	0810		3310			2200	790
51	720902	0840		3310			13000	170
51	720903	0910		3310			3300	230

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
52	720830	0805		3310			790	20
52	720831	0805		3310			1100	490
52	720901	0810		3310			1100	330
52	720902	0835		3310			1300	1300
52	720903	0920		3310			1100	790
53	720830	0815		3310			33000	20
53	720831	0815		3310			7000	200K
53	720901	0825		3310			120000	1700
53	720902	0820		3310			4900	200K
53	720903	0930		3310			7900	140
54	720830	0825		3310			1600000	23000
54	720831	0820		3310			390000	4900
54	720901	0835		3310			170000	3300
54	720902	0810		3310			14000	800
54	720903	0945		3310			17000	700
55	720830	0915		3310			330	110
55	720831	0830		3310			490	50
55	720901	0850		3310			1800	460
55	720902	0800		3310			460	70
55	720903	0955		3310			490	110
56	720830	0935		3310			20	20K
56	720831	0845		3310			20	20
56	720901	0915		3310			20	20K
56	720902	0740		3310			40	20K
56	720903	1015		3310			70	70
57	720830	0650		3310			80	20K
57	720831	0707		3310			70	20
57	720901	0720		3310			490	20
57	720902	0935		3310			20K	20K
57	720903	0820		3310			20K	20K

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALAHASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME	DEPTH	70211 TIDE STAGE	00010 WATER TEMP CENT	00940 CHLORIDE CL MG/L	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML
58	720830	1030		3310			4900	1700
58	720831	0717		3310			2300	330
58	720901	0730		3310			92000	54000
58	720902	0925		3310			540000	350000
58	720903	0835		3310			7900	1300
59	720901	0715		3310			230	20
59	720902	0935		3310			40	40
59	720903	0815		3310			20K	20K
60	720901	0825		3310			90	20
60	720902	0820		3310			90	20K
60	720903	0930		3310			80	20K
61	720901	0835		3310			2200	50
61	720902	0810		3310			490	20
61	720903	0945		3310			20	20K

ENVIRONMENTAL PROTECTION AGENCY REGION IV
SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME		DATE	TIME	DEPTH	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML	50050 CONDUIT FLOW MGD	50060 CHLORINE TOT RESD MG/L
OD-01	720411	1020				0001			0.101	
OD-01	720411	1117				0001			0.101	
OD-01	720411	0915	(C)	720411	1117	0001	3500000	790000		
OD-01	720411	1222				0001			0.101	
OD-01	720411	1320				0001			0.101	
OD-01	720411	1420				0001			0.101	
OD-01	720411	1222	(C)	720411	1420	0001	2400000	330000		
OD-01	720411	1520				0001			0.101	
OD-01	720411	1615				0001			0.101	
OD-01	720411	1720				0001			0.101	
OD-01	720411	1520	(C)	720411	1720	0001	2200000	230000		
OD-01	720411	1820				0001			0.101	
OD-01	720411	1910				0001			0.101	
OD-01	720411	1820	(C)	720411	1910	0001	790000	330000		
OD-01	720412	0745				0001			0.073	
OD-01	720412	0845				0001			0.073	
OD-01	720412	0945				0001			0.073	
OD-01	720412	0745	(C)	720412	0945	0001	1700000	330000		
OD-01	720412	1045				0001			0.086	
OD-01	720412	1145				0001			0.086	
OD-01	720412	1245				0001			0.086	
OD-01	720412	1045	(C)	720412	1245	0001	450000	330000		
OD-01	720412	1345				0001			0.086	
OD-01	720412	1445				0001			0.101	
OD-01	720412	1545				0001			0.101	
OD-01	720412	1345	(C)	720412	1545	0001	1700000	280000		
OD-01	720412	1645				0001			0.086	
OD-01	720412	1745				0001			0.086	
OD-01	720412	1845				0001			0.101	
OD-01	720412	1645	(C)	720412	1845	0001	1700000	230000		
OD-01	720826	0740							0.258	
OD-01	720826	0840							0.258	
OD-01	720826	0950							0.258	
OD-01	720826	0740	(C)	720826	0950		13000000	2200000		
OD-01	720826	1035							0.272	
OD-01	720826	1130							0.272	
OD-01	720826	1225							0.272	
OD-01	720826	1035	(C)	720826	1225		5400000	1300000		
OD-01	720826	1320							0.272	
OD-01	720826	1415							0.272	
OD-01	720826	1515							0.346	
OD-01	720826	1320	(C)	720826	1515		13000000	1300000		
OD-01	720826	1615							0.330	
OD-01	720826	1715							0.330	
OD-01	720826	1810							0.330	
OD-01	720826	1615	(C)	720826	1810		4900000	490000		
OD-01	720827	0645							0.245	

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SURVEILLANCE AND ANALYSIS DIVISION ATHENS, GEORGIA

LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME		DATE	TIME	DEPTH	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML	50050 CONDUIT FLOW MGD	50060 CHLORINE TOT RESD MG/L
OD-01	720827	0747								
OD-01	720827	0845							0.245	
OD-01	720827	0845	(C)	720827	0845		5400000	490000	0.245	
OD-01	720827	0945								
OD-01	720827	1045							0.245	
OD-01	720827	1140							0.245	
OD-01	720827	0945	(C)	720827	1140		3500000	1300000	0.245	
OD-01	720827	1245								
OD-01	720827	1347							0.286	
OD-01	720827	1445							0.315	
OD-01	720827	1245	(C)	720827	1445		230000	230000	0.300	
OD-01	720827	1545								
OD-01	720827	1645							0.300	
OD-01	720827	1745							0.315	
OD-01	720827	1545	(C)	720827	1745		17000000	1100000	0.300	
CB-01	720411	0909								
CB-01	720411	1000				0001			0.065	
CB-01	720411	1100				0001			0.076	
CB-01	720411	0909	(C)	720411	1100	0001			0.067	
CB-01	720411	1200				0001	33000	3300		
CB-01	720411	1300				0001			0.067	
CB-01	720411	1400				0001			0.067	
CB-01	720411	1200	(C)	720411	1400	0001			0.072	
CB-01	720411	1500				0001	22000	2300		
CB-01	720411	1600				0001			0.067	
CB-01	720411	1700				0001			0.065	
CB-01	720411	1500	(C)	720411	1700	0001			0.072	
CB-01	720411	1800				0001	23000	7400		
CB-01	720411	1900				0001			0.065	
CB-01	720411	1800	(C)	720411	1900	0001			0.065	
CB-01	720412	0730				0001	23000	3300		
CB-01	720412	0830				0001			0.065	
CB-01	720412	0930				0001			0.065	
CB-01	720412	0730	(C)	720412	0930	0001			0.065	
CB-01	720412	1030				0001	2800	1700		
CB-01	720412	1130				0001			0.065	
CB-01	720412	1230				0001			0.065	
CB-01	720412	1030	(C)	720412	1230	0001			0.067	
CB-01	720412	1330				0001	13000	13000		
CB-01	720412	1430				0001			0.076	
CB-01	720412	1530				0001			0.081	
CB-01	720412	1330	(C)	720412	1530	0001			0.076	
CB-01	720412	1630				0001	92000	24000		
CB-01	720412	1730				0001			0.072	
CB-01	720412	1830				0001			0.072	
									0.076	

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LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
(APRIL AND AUGUST, 1972)

STATION	DATE	TIME		DATE	TIME	DEPTH	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML	50050 CONDUIT FLOW MGD	50060 CHLORINE TOT RESD MG/L
CB-01	720412	1630	(C)	720412	1630	0001	54000	35000		
CB-01	720826	0730							0.163	
CB-01	720826	0830							0.174	
CB-01	720826	0925							0.174	
CB-01	720826	0730	(C)	720826	0925		2400000	490000		
CB-01	720826	1012							0.185	
CB-01	720826	1115							0.174	
CB-01	720826	1210							0.174	
CB-01	720826	1012	(C)	720826	1210		2200000	430000		
CB-01	720826	1305							0.185	
CB-01	720826	1400							0.185	
CB-01	720826	1500							0.196	
CB-01	720826	1305	(C)	720826	1500		13000000	330000		
CB-01	720826	1600							0.196	
CB-01	720826	1700							0.196	
CB-01	720826	1755							0.196	
CB-01	720826	1600	(C)	720826	1755		13000000	1300000		
CB-01	720827	0630							0.174	
CB-01	720827	0730							0.185	
CB-01	720827	0830							0.185	
CB-01	720827	0630	(C)	720827	0830		2200000	1100000		
CB-01	720827	0930							0.185	
CB-01	720827	1030							0.185	
CB-01	720827	1130							0.196	
CB-01	720827	0930	(C)	720827	1130		9200000	2200000		
CB-01	720827	1230							0.196	
CB-01	720827	1330							0.196	
CB-01	720827	1430							0.185	
CB-01	720827	1230	(C)	720827	1430		4900000	1100000		
CB-01	720827	1530							0.185	
CB-01	720827	1630							0.185	
CB-01	720827	1730							0.185	
CB-01	720827	1530	(C)	720827	1730		9200000	1300000		
LMB-01	720413	0825				0001			1.700	
LMB-01	720413	0925				0001			1.700	
LMB-01	720413	1025				0001			1.700	
LMB-01	720413	0825	(C)	720413	1025	0001	5400000	1300000		
LMB-01	720413	1125				0001			1.700	
LMB-01	720413	1225				0001			1.700	
LMB-01	720413	1327				0001			1.700	
LMB-01	720413	1125	(C)	720413	1327	0001	9200000	1700000		
LMB-01	720413	1428				0001			1.700	
LMB-01	720413	1523				0001			1.700	
LMB-01	720413	1627				0001			1.700	
LMB-01	720413	1428	(C)	720413	1627	0001	2400000	2400000		

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(APRIL AND AUGUST, 1972)

STATION	DATE	TIME		DATE	TIME	DEPTH	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML	50050 CONDUIT FLOW MGD	50860 CHLORINE TOT RESD MG/L
LMB-01	720413	1725				0001				
LMB-01	720413	1825				0001			1.700	
LMB-01	720413	1930				0001			1.700	
LMB-01	720413	1725	(C)	720413	1930	0001	2400000	490000	1.700	
LMB-01	720414	0710				0001				
LMB-01	720414	0810				0001			1.600	
LMB-01	720414	0910				0001			1.600	
LMB-01	720414	0710	(C)	720414	0910	0001	2400000	790000	1.600	
LMB-01	720414	1010				0001				
LMB-01	720414	1112				0001			1.600	
LMB-01	720414	1210				0001			1.600	
LMB-01	720414	1010	(C)	720414	1210	0001	16000000	1300000	1.600	
LMB-01	720414	1315				0001				
LMB-01	720414	1415				0001			1.600	
LMB-01	720414	1505				0001			1.600	
LMB-01	720414	1315	(C)	720414	1505	0001	1100000	490000	1.600	
LMB-01	720414	1610				0001				
LMB-01	720414	1714				0001			1.600	
LMB-01	720414	1805				0001			1.600	
LMB-01	720414	1610	(C)	720414	1805	0001	9200000	460000	1.600	
LMB-01	720822	0715								
LMB-01	720822	0810							3.020	
LMB-01	720822	0915							2.960	
LMB-01	720822	0715	(C)	720822	0915		1100000	790000	2.960	
LMB-01	720822	1015								
LMB-01	720822	1115							2.960	
LMB-01	720822	1210							2.960	
LMB-01	720822	1015	(C)	720822	1210		1100000	790000	3.020	
LMB-01	720822	1310								
LMB-01	720822	1410							3.080	
LMB-01	720822	1510							3.020	
LMB-01	720822	1310	(C)	720822	1510		3500000	1300000	3.020	
LMB-01	720822	1610								
LMB-01	720822	1700							3.020	
LMB-01	720822	1810							3.020	
LMB-01	720822	1610	(C)	720822	1810		3500000	330000	3.140	
LMB-01	720823	0720								
LMB-01	720823	0815							2.860	
LMB-01	720823	0915							2.860	
LMB-01	720823	0720	(C)	720823	0915		2400000	720000	2.800	
LMB-01	720823	1015								
LMB-01	720823	1110							2.800	
LMB-01	720823	1200							2.860	
LMB-01	720823	1015	(C)	720823	1200		5400000	1700000	2.860	
LMB-01	720823	1320								
LMB-01	720823	1415							2.860	
LMB-01	720823	1510							2.860	
									2.860	

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LITTLE RIVER, SOUTH CAROLINA---CALABASH CREEK, NORTH CAROLINA STUDY
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STATION	DATE	TIME		DATE	TIME	DEPTH	31505 T.C. COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML	50050 CONDUIT FLOW MGD	50060 CHLORINE TOT RESD MG/L
LMB-01	720823	1320	(C)	720823	1510		5400000	1300000		
LMB-01	720823	1615							2.920	
LMB-01	720823	1710							2.920	
LMB-01	720823	1810							2.920	
LMB-01	720823	1615	(C)	720823	1810		2400000	790000		
UMB-01	720413	0855				0001			0.300	
UMB-01	720413	0955				0001			0.300	
UMB-01	720413	1055				0001			0.300	
UMB-01	720413	0855	(C)	720413	1055	0001	1100000	130000		
UMB-01	720413	1143				0001			0.300	
UMB-01	720413	1257				0001			0.300	
UMB-01	720413	1355				0001			0.300	
UMB-01	720413	1143	(C)	720413	1355	0001	490000	490000		
UMB-01	720413	1455				0001			0.220	
UMB-01	720413	1553				0001			0.220	
UMB-01	720413	1650				0001			0.220	
UMB-01	720413	1455	(C)	720413	1650	0001	1100000	140000		
UMB-01	720413	1750				0001			0.220	
UMB-01	720413	1850				0001			0.220	
UMB-01	720413	1950				0001			0.220	
UMB-01	720413	1750	(C)	720413	1950	0001	1300000	170000		
UMB-01	720414	0730				0001			0.270	
UMB-01	720414	0830				0001			0.270	
UMB-01	720414	0930				0001			0.270	
UMB-01	720414	0730	(C)	720414	0930	0001	1300000	110000		
UMB-01	720414	1035				0001			0.270	
UMB-01	720414	1132				0001			0.270	
UMB-01	720414	1225				0001			0.270	
UMB-01	720414	1035	(C)	720414	1225	0001	1400000	330000		
UMB-01	720414	1333				0001			0.210	
UMB-01	720414	1432				0001			0.210	
UMB-01	720414	1525				0001			0.210	
UMB-01	720414	1333	(C)	720414	1525	0001	790000	330000		
UMB-01	720414	1630				0001			0.210	
UMB-01	720414	1734				0001			0.210	
UMB-01	720414	1824				0001			0.210	
UMB-01	720414	1630	(C)	720414	1824	0001	330000	170000		
UMB-01	720822	0740							0.391	
UMB-01	720822	0900							0.391	
UMB-01	720822	0940							0.384	
UMB-01	720822	0740	(C)	720822	0940		2200000	490000		
UMB-01	720822	1040							0.384	
UMB-01	720822	1130							0.384	
UMB-01	720822	1230							0.384	
UMB-01	720822	1040	(C)	720822	1230		3500000	1300000		

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(APRIL AND AUGUST, 1972)

STATION	DATE	TIME		DATE	TIME	DEPTH	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML	50050 CONDUIT FLOW MGD	50060 CHLORINE TOT RESD MG/L
UMB-01	720822	1330							0.391	
UMB-01	720822	1430							0.391	
UMB-01	720822	1530							0.391	
UMB-01	720822	1330	(C)	720822	1530		5400000	1700000		
UMB-01	720822	1630							0.391	
UMB-01	720822	1715							0.391	
UMB-01	720822	1815							0.391	
UMB-01	720822	1630	(C)	720822	1815		2400000	790000		
UMB-01	720823	0735							0.355	
UMB-01	720823	0830							0.355	
UMB-01	720823	0930							0.355	
UMB-01	720823	0735	(C)	720823	0930		7000000	1400000		
UMB-01	720823	1030							0.355	
UMB-01	720823	1130							0.355	
UMB-01	720823	1215							0.355	
UMB-01	720823	1030	(C)	720823	1215		4900000	460000		
UMB-01	720823	1340							0.450	
UMB-01	720823	1430							0.450	
UMB-01	720823	1530							0.450	
UMB-01	720823	1340	(C)	720823	1530		7900000	490000		
UMB-01	720823	1630							0.450	
UMB-01	720823	1730							0.450	
UMB-01	720823	1815							0.450	
UMB-01	720823	1630	(C)	720823	1815		3500000	3500000		
WC-01	720411	0940				0001			0.004	
WC-01	720411	1040				0001			0.002	
WC-01	720411	1135				0001			0.006	
WC-01	720411	0940	(C)	720411	1135	0001	20K	20K		
WC-01	720411	1240				0001			0.003	
WC-01	720411	1342				0001			0.002	
WC-01	720411	1440				0001			0.006	
WC-01	720411	1240	(C)	720411	1440	0001	20K	20K		
WC-01	720411	1540				0001			0.004	
WC-01	720411	1640				0001			0.002	
WC-01	720411	1730				0001			0.002	
WC-01	720411	1540	(C)	720411	1730	0001	20K	20K		
WC-01	720412	0815				0001			0.002	0.50
WC-01	720412	0915				0001			0.002	5.00
WC-01	720412	1015				0001			0.006	8.00
WC-01	720412	0815	(C)	720412	1015	0001	20K	20K		
WC-01	720412	1117				0001			0.006	8.00
WC-01	720412	1218				0001			0.002	8.00
WC-01	720412	1300				0001			0.004	7.00
WC-01	720412	1117	(C)	720412	1300	0001	20K	20K		
WC-01	720412	1430				0001			0.004	8.00

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(APRIL AND AUGUST, 1972)

STATION	DATE	TIME		DATE	TIME	DEPTH	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML	50050 CONDUIT FLOW MGD	50060 CHLORINE TOT RESD MG/L
WC-01	720412	1520				0001			0.004	15.00L
WC-01	720412	1630				0001			0.006	15.00L
WC-01	720412	1730				0001			0.002	15.00L
WC-01	720412	1430	(C)	720412	1730	0001	20K	20K		
AFB-01	720412	0800				0001			0.254	1.00
AFB-01	720412	0900				0001			0.254	0.60
AFB-01	720412	1000				0001			0.254	1.10
AFB-01	720412	0800	(C)	720412	1000	0001	790	230		
AFB-01	720412	1100				0001			0.254	0.75
AFB-01	720412	1200				0001			0.254	0.10
AFB-01	720412	1300				0001			0.254	1.75
AFB-01	720412	1100	(C)	720412	1300	0001	540000	49000		
AFB-01	720412	1400				0001			0.254	1.40
AFB-01	720412	1500				0001			0.254	0.50
AFB-01	720412	1600				0001			0.254	1.25
AFB-01	720412	1400	(C)	720412	1600	0001	50	20K		
AFB-01	720412	1700				0001			0.254	1.00
AFB-01	720412	1800				0001			0.254	0.75
AFB-01	720412	1840				0001			0.254	0.50
AFB-01	720412	1700	(C)	720412	1840	0001	130	20		
AFB-01	720413	0745				0001			0.259	5.50
AFB-01	720413	0845				0001			0.259	3.50
AFB-01	720413	0945				0001			0.259	3.00
AFB-01	720413	0745	(C)	720413	0945	0001	20	20K		
AFB-01	720413	1045				0001			0.259	1.50
AFB-01	720413	1145				0001			0.259	1.50
AFB-01	720413	1245				0001			0.259	1.50
AFB-01	720413	1045	(C)	720413	1245	0001	700	200K		
AFB-01	720413	1345				0001			0.259	3.50
AFB-01	720413	1445				0001			0.259	1.75
AFB-01	720413	1545				0001			0.259	2.50
AFB-01	720413	1345	(C)	720413	1545	0001	50	20K		
AFB-01	720413	1645				0001			0.259	2.25
AFB-01	720413	1745				0001			0.259	2.50
AFB-01	720413	1845				0001			0.259	2.50
AFB-01	720413	1645	(C)	720413	1845	0001	20K	20K		
AFB-01	720824	0700							0.519	
AFB-01	720824	0800							0.519	1.00L
AFB-01	720824	0900							0.519	1.00L
AFB-01	720824	0700	(C)	720824	0900		54000	4900		
AFB-01	720824	1000							0.519	1.00L
AFB-01	720824	1100							0.519	0.90
AFB-01	720824	1200							0.519	0.80
AFB-01	720824	1000	(C)	720824	1200		7000	1700		
AFB-01	720824	1300							0.519	0.00

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STATION	DATE	TIME		DATE	TIME	DEPTH	31505 TOT COLI MPN CONF /100ML	31615 FEC COLI MPNECMED /100ML	50050 CONDUIT FLOW MGD	50060 CHLORINE TOT RESD MG/L
AFB-01	720824	1400							0.519	0.00
AFB-01	720824	1500							0.519	0.20
AFB-01	720824	1300	(C)	720824	1500		24000 ML	1600000		
AFB-01	720824	1600							0.519	0.15
AFB-01	720824	1700							0.519	0.10
AFB-01	720824	1800							0.519	0.50
AFB-01	720824	1600	(C)	720824	1800		13000	230		
AFB-01	720825	0800							0.519	0.05
AFB-01	720825	0900							0.519	0.10
AFB-01	720825	0700	(C)	720825	0900		330	40		
AFB-01	720825	1000							0.519	0.05
AFB-01	720825	1100							0.519	0.10
AFB-01	720825	1000	(C)	720825	1200		460	20		
AFB-01	720825	1300							0.519	0.60
AFB-01	720825	1400							0.519	0.80
AFB-01	720825	1445							0.519	0.50
AFB-01	720825	1300	(C)	720825	1445		13000	800		
AFB-01	720825	1605							0.519	0.40
AFB-01	720825	1700							0.519	0.10
AFB-01	720825	1755							0.519	0.05
AFB-01	720825	1605	(C)	720825	1755		13000	490		

* U.S. GOVERNMENT PRINTING OFFICE : 1973 748-253/3221 REGION 4